

SHORT STUDIES IN ECONOMIC & COMMERCIAL GEOGRAPHY

(With a Special Treatment of India)

With a foreword by

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FOREWORD

The study of Economic and Commercial Geography, and or that matter, General Geography, has long been neglected in this country and yet the importance of such a study can hardly be over-emphasised. Signs are, however, not wanting to show that our universities have, at last, come to realise the importance of geography in all its branches: and to-day it is gratifying that the subject is being given its proper place and recognition in the different university courses. It is indeed a happy augury of the times, that the University of Calcutta has recently included this subject for a post-graduate course.

In the commercial and industrial world, a knowledge of Economic and Commercial Geography is daily assuming increasing importance and it is in the fitness of things, that it has been recognised as an important subject for study, specially for students who are preparing themselves for a commercial career.

The present work has been written specially for such students. I am sure it will serve its object and be of use to those for whom it is specially intended. The general public will also find in it things which will deserve attention.

I recommend the book to all who are interested in the subject.

Teachers' Training Department,
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27.41.

A. N. BASU.

PREFACE

This little book does not pretend to have covered entirely that vast mass of facts and statistics, necessary and unnecessary, which sometimes forms the material of the books on Economic Geography, at present available to the Indian students. Although elementary, it is hoped that the book will be of much assistance to the Commerce students of the Universities of India, and open the way for them to the study of more comprehensive works on the subject. This treatise divides itself into two parts. In the first part, an attempt has been made to present the principles of Economic Geography on a world basis. The second part is concerned with the geographical description of the important countries of the world and explanation of the local differences upon which depends the existence of international trade and commerce. No pains have been spared to make the book up-to-date, but there are obvious limits to my task, in a world where events are moving fast—perhaps too fast for many of us.

A book of this type can scarcely lay any claim to originality and wherever possible my debt to various eminent authors has been acknowledged in the foot-notes. My thanks are due to Sree Jagadindu Bagebi, M.A., for his valuable assistance in the preparation of this work. The cartography has been done by Sree Anil Mukherji.

Lastly, I would be failing in my duty, if I do not express my gratitude to Prof. Anath Nath Bose, of the Calcutta University, for his having kindly written the foreword inspite of his numerous preoccupations.

All suggestions, from teachers and students alike, will be thankfully received.

NOTE TO THE SECOND EDITION

In this new edition a number of statements and statistics have been revised or brought up-to-date and a number of new developments in various parts of the world have been included. The section on India has been thoroughly revised and enlarged. New maps and diagrams have been introduced.

I thank all my friends and colleagues in the various colleges and universities for their sympathy and encouragement. Finally I must express my gratitude to my friend Sree Ganesh Ch Bose of Messrs Book Land Ltd, Calcutta, without whose invaluable assistance I could not have brought out this edition.

Asansol,
March, 1947.

M. N. B.

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'Causal
Geography'

Method.—As has just been indicated, modern geography, in effect, is 'causal geography'; it looks for causes and tries to trace their influence 'in the world of to-day.'

Old
method of
working
from effect
to cause

Thus it works, in common with all other sciences, from cause to effect¹. The facts unearthed by early explorers and systematized by geographers of their day were, no doubt, capable of study with a view to determine their underlying causes; and those who actually did study them that way took the reverse order of working from the effect to the cause. With the dawn of modern geography, however, it came to be realized that a handful of causes are at the root of a multitude of otherwise unrelated facts. So the modern geographer has taken to the course of working from cause to effect. Thus there has come about a complete reversal of method in the study of Geography.

New
method of
working
from cause
to effect

Environment
and Man

Scope.—Geography then is concerned with two fields of inquiry—environment and man. It must, therefore, deal with the origin and evolution of this environment as well as with human life and activity. Hence the geographer is led into the fields of various other sciences—Astronomy, Meteorology, Geology, Physiography, Botany, Ecology, Sociology, Economics, etc. But the results culled from these and similar other sources do not constitute Geography, neither does the study of man as he is or of his social, political and economic institutions comprise Geography. Its chief interest lies in tracing the mutual relationship of man and his physical environment. That is its distinctive field, and a study of it is its special function. The geographer draws upon the results furnished by others, but he takes just so much as is required for his special purpose, *viz.*, to study the 'human environment' as such. No other science is concerned

Geography
and other
sciences

Distinctive
scope and
function of
Geography

¹ Stamp, *A Commercial Geography*, p. 1. See also Case and Bergsmark, *College Geography*, p. VII.

with that environment as it is. "To geography belongs the task of making clear the relationship existing between environments and the distribution and activities of man."

The fact is that Geography is not so much a science as a ^{Geography as essentially a} scientific point of view—just as history, in effect, is. And as such it has no definite subject-matter at all. In order to ^{point of view.} acquire a content, it has to associate itself with some adjective or other: for only in that way can there be any meaning in the terms 'political geography,' 'commercial geography', etc. In other words, the sphere of Geography is as wide as the sphere of human activity itself. This is one of the reasons indeed why "the claim has frequently been made that geography is the mother of sciences."

Economic Geography is thus defined as "the study of the influence exerted upon the economic activities of man by his physical environment." *Commercial Geography* is really a part of the study of *Economic Geography*. It is, strictly speaking, a study of the exchange of products; of the places where these are produced, of the methods of their production and the means of their transportation. Meaning of Commercial Geography.

STUDIES AND QUESTIONS

1. "Geography is the study of the world as the home of man."—Explain.

2. The claim has often been made that Geography is a science, neither more nor less. Is it a valid claim? Give reasons for your answer.

3. Discuss the scope and function of Geography as a science

¹ Case & Bergsmark, *College Geography*, p. IX. See also Stamp, *Modern Geographical Ideas*, p. 3, and J. F. Chamberlain, *Geography*, p. 17.

² Stamp, *Modern Geographical Ideas*, p. 44

³ Case and Bergsmark, *College Geography*, p. VII.

CHAPTER II

The Environmental Factors

Man & Environment.—The earth is the great reservoir whence man derives the raw materials with which he builds his own world. The economic activity of man is directed towards the production of goods from the raw materials supplied by nature. The whole of production is, in the last resort, dependent upon nature. Geographical factors such as topography, climate, vegetation, etc., all act as controls in determining the distribution of economic resources and animal life, and hence they are often referred to as "Geographical Control". In a sense this is not a wrong conception; for certainly the world or the physical environment sets broad limits to human activity and enterprise, and often does it drive him to specified lines of action. Yet, as it has been pointed out by others, man is, to all intents and purposes, a free agent so far as the design is concerned, and, what is more, he is rightly credited with some amount of creative genius. Hence many prefer to call it 'Geographical Influence': we are, doubtless, greatly influenced by environmental factors, but not really controlled by them. These physical factors do not determine absolutely the character of economic life, specially in advanced civilizations when man has learned to overcome the difficulties imposed by nature and to obtain from her an increased benefit.

Geographi-
cal Control
vs.
Geographi-
cal Influence.

Environment
acts as
a whole.

If then Geography is to be a study of the world as the home of man, our first task here would be to analyse the environment which constitutes the world. It must also be noted before we proceed with the analysis that environment,

though capable of analysis, really affects us as a whole. The task of the geographer is, therefore, twofold; he must analyse the different factors of the environment so as to trace the influence exerted by each severally, and then take into account the influence exercised by the whole collectively. What then are the factors constituting the physical environment?

Geographer's
twofold
task.

1. **Location or Position.**—Of these location or position is one, and by many it is regarded as the prime factor.¹ What exactly is meant by location? A country or a town or even a home is situated in a particular spot which is unalterable; that is its exact position or location. In that sense location is an absolute fact,—it is fixed. But it also stands in a certain relationship to its neighbourhood; it may be so many yards north of a certain hillock, so many cubits south of a certain tank, and so on. Our daily life is greatly influenced by these facts. If the distance of the main road from our home be considerable we prepare for going to school or college rather early; if our home be near about the main road we are not in such a hurry; a man who is obliged to catch a local train for attending office, does not habitually return home for tiffin. Widen your outlook, and note the relative position of your town or village on the map of your district. It is possible likewise to ascertain the position of a country or a state. Thus India holds a central position in the East, the British Isles are centrally situated in the Land Hemisphere of the globe, New Zealand is on the margin of the habitable world, and so on. These situations have profound influence on the national economy of all these countries. Great Britain's pre-eminence is largely traced to the ideal position she holds; she can easily exercise control over oceanic commerce passing through the Atlantic and the North Sea; hence her plantations

Location as
absolute
fact

Location
as relative
fact.

Influence of
location on
national
economy.

Britain

¹ See, for example, E. C. Semple, *Geographical Location as a Factor in History*, p. 65

India

in America thrived quite well, whereas those of France and Spain steadily declined: it was British sea-power that made possible the United States of America. In the past India similarly was in more or less effective control of trade and commerce passing through the Indian Ocean, the Arabian Sea and the Bay of Bengal. The fabulous wealth of Ind was not a little due to that factor. On the other hand, New Zealand is distinctly handicapped in her national economy owing largely to her peripheral situation. Much of her trade is with Great Britain, but since she is far off from the Mother Country she must specialize in commodities that can stand the long voyage and yet pay the enormous cost of transport.¹

New Zealand.

Influence of location on climate, flora and fauna.

Location also determines the climatic condition of a country. A country may be situated near the equator or any of the poles, and its climatic conditions will vary accordingly. And with this will there be seen a corresponding variation in the flora and fauna of the country. This in turn cannot but have profound effect on the agriculture and industry of that region. Thus location has an indirect and yet unmistakable effect on the trade and commerce of a place. The United States of America, despite her enormous territory, must always be dependent on foreign supplies for the equatorial and tropical products like rubber, cane-sugar, cocoa, tea and the like; Canada must maintain the closest possible trade relations with the British West Indies for a similar consideration; Russia cannot let her hold on Turkestan go without serious consequences to her own cotton industry.²

Influence of location on trade and commerce

Now-a-days, however, the ill effects of a marginal position can be largely mitigated by means of railways, auto-tracks, steam ships, aeroplanes, the telephone, the radio, etc.³

¹ Stamp, *A Commercial Geography*, p. 5

² Stamp, *Modern Geographical Ideas*, pp. 33-34

³ Case & Bergsmark, *College Geography*, p. 45

But they cannot be totally obliterated. Position or location is an environmental factor, which can be modified but not altered materially.¹ In the past it took about six months to come to India from Great Britain, and nearly a year to reach Australia from the British Isles; to-day barely a week is required for a flight to India from England, but it takes no less than two weeks to reach Australia. Although distance has greatly been minimized to-day by the development of modern means of travel, its relativity still remains. India will always be nearer to England than Australia.

Man's
influence
on location.

2. **Physical Features.**—The second of these factors, according to Stamp², is the surface relief or physical features of a country. The influence of this factor both on the life of the individual and that of a country is quite obvious. Perhaps no other factor, except climate, has played so large a part in the distribution of population all the world over. Even in the most densely populated country—China—the mountainous regions are so thinly peopled as to appear desolate and forlorn, while the flat plains below teem with people. Many families there prefer to live in boats rather than find out a home on the bare and rugged mountains. The plains occupy less than two-fifths of the earth's surface, but they are the home of more than four-fifths of the world's population.³ Topography or the physical features of a country thus play a permanent and leading part in human life and activity. It is difficult to build towns and villages on the mountains; so in a mountainous country like Nepal, for example, these are restricted to the valleys affording comparatively flat land. Nepal is a fairly large

Physical
features
and
distribution
of people.

China

Nepal.

¹ Stamp, *A Commercial Geography*, p. 6

² See, for example, *A Commercial Geography*. It is, however, doubtful whether a gradation as suggested by Stamp of the environmental factors is possible

³ Case & Bergsmark, *College Geography*, p. 101-2. Plains here mean lands below the 1,500-foot contour.

India
and other
countries.

country with a total area of about 55,000 square miles, and yet her life centres round the celebrated valley of Nepal, which is only about 15 miles long and 7 miles wide.¹ As mountains generally repel settlement, so on the other hand plains invite occupancy, and unless the latter are thickly forested or deficient in rainfall, they become densely populated.² Of the enormous population of India nearly one-third are found in the deltas of the Ganges and the Indus. Holland, Belgium, the plains of France, Germany and the British Isles, the Nile Valley etc., are the great centres of population in the world, because of the levelness of the land and the greater facilities for carrying on agricultural and industrial work.

Man's
influence on
topography

Man's influence on the topography or physical features of the earth's surface is, however, comparatively small. It is true that he can mitigate the ill effects, for example, of a mountain barrier by cutting a tunnel across it, or reclaim submerged lands from shallow seas or establish contact between oceans separated by narrow isthmuses, yet he can by no means materially alter the topography of a country by blowing up mountains so as to reduce it to a level plain, or erecting a mountain barrier where there is none. Switzerland will always be a mountainous country and Holland a level plain, and man must always modify his life according to the topography of the place he lives in.

Geological
structure
and
mineral
wealth and
agricultural
possibilities

3. Geological Structure.—The surface features of a country are really the reflection of its underlying geological structure,—its outward and visible result.³ The geological structure of a country has great bearing on its trade and commerce. The areas of old hard rocks are comparatively

¹ Stamp, *Asia*, pp 354-5

² J. F. Chamberlain, *Geography*, p 117

³ Stamp, *A Commercial Geography*, pp 6-7.

barren from the point of view of agriculture, but are generally associated with metalliferous minerals. The areas of young soft rocks, on the other hand, are commonly suitable for agriculture, and are generally associated with non-metallic minerals like coal and oil. To the former class belong the major plateau regions of the world—the Brazilian plateau, the Guiana Highlands, the greater part of Africa, Arabia, Peninsular India, Indo-China, the great plateau of Australia, Central Siberia, Scandinavia, the Highlands of Scotland and North-Western Ireland. The great Laurentian Shield of Canada and the vast Russian platform belong to another subdivision of this group of ancient rocks. To the second group belong the Central Plains of North America, the plains of the Orinoco, Amazon and Paraguay in South America, the North European Plain, the lowlands of Western Siberia, the valleys of the Tigris, the Euphrates, the Indus, the Ganges, the Brahmaputra, the Hwang Ho, the Yangtze Kiang, the Si Kiang, and the central plains of Australia. The great fold mountains—the Alps, the Himalayas, the Rockies and the Andes—belong to this second group.

The influence of man on his geological environment is even smaller than that on the surface features. He can, of course, modify the natural barrenness of the soil by the use of suitable manure, plant stout trees for the prevention of soil erosion and do other things of a like nature; but even in these things he can at best be only partially successful. But can he ever put a gold field where there is none?

✓ **Climate and Weather.**—Climate is the great uncertain factor of our physical environment,¹ and its influence is manifest everywhere and patent to everybody. Almost at every step our activity is governed by the weather of the moment. Climate and weather are basically the same, the

¹ Carey & Bergsmark, *College Geography*, pp. 4-7.

Instances of climatic influence on man's everyday life.

one being the average state of the atmospheric conditions, the other a fluctuation from that average state for a short period of time. It is needless to dwell on the influence of climate and weather on our everyday life, on our dress, games, holidays and the like. But perhaps we are a stay-at-home people and do not know how climatic conditions determine the very form of man's dwelling-places in different lands. In the northern latitudes they build steep-roofed houses so that the snow may easily slide away, in arid lands, again, people erect flat-roofed houses, and sometimes these roofs are seen to have a slope towards the centre and a tank below for the collection of rain-water as in the Punjab and the adjacent areas. In Bengal and Assam where there is abundant precipitation during the rains and no scarcity of river water throughout the year generally, we do not collect rain-water except for sport; our houses are so contrived as to shoot it off our roofs to the vicinity of our neighbours' homes.

Climate and Vegetation.

But the effect of climate is even more marked on the natural vegetation of different lands. Even in a single country like India or in a single province like Bengal it is well illustrated. No passerby can ever ignore the light green of a paddy field in the rural areas of Bengal; but how often does one come across fields of wheat here? The moist climate of the province is not at all suitable for the latter crop. Again, a tea garden is quite conspicuous by its absence throughout the greater part of Bengal to a visitor from the distant Nilgris or even to one from the neighbouring province of Assam, and a man from the Duars may well doubt whether it is his own province Bengal.

Climate and Soil.

Climate also has profound influence on the soil; in fact it is much more important for the formation of soil than even the underlying geological structure. Thus in the Tropics,

for example, a cellular-shaped red-brown type of soil is produced owing to the alternation of dry and wet seasons, independently of the character of the underlying rocks. And it has also been discovered that in regions where precipitation takes place in the hot season soil formation is rapid, but where the rains coincide with the cold season, as in the Mediterranean regions, the formation of soil goes on very slowly.¹

The reciprocal influence of man on his climatic environment may superficially appear to be more marked than his influence on either topography or geology. Our clothes and garments, our houses, our summer holidays, all are but different adaptations to our climatic environment. Not only that: man has also invented 'sun-trap' houses, air-cooled houses, refrigerators, glass-houses for flowers and vegetables; he has elaborated the system of drainage to combat too much moisture in the soil, and that of irrigation to overcome the deficiencies of moisture. But we do not know yet how to prevent rain when necessary or how to force rain out of the sailing cloudlets to drench the parched lips of cracked agricultural lands. In fact, man has as yet no control over climate and weather.

Man's
influence on
climate

5. **Vegetation and Soil.**—Of the factors hitherto enumerated location, in fact, is an independent factor, and physical features are the products largely of the underlying geological structure. Climate and weather, though dependent on location and physical features, are essentially extra-terrestrial in origin. But vegetation is "an index of the interaction of the foregoing factors."² It reflects the particular location of the area in which it grows, the physical conditions of that area, as well as the climate of the place. Of course vegetation springs directly from the soil and thus must reflect

Dependence
of vegetation
on other
factors

Dependence
of soil
on other
factors

¹ Stamp, *Modern Geographical Ideas*, p. 9.

² Stamp, *A Commercial Geography*, p. 8.

CHAPTER III

THE MAJOR CLIMATIC REGIONS OF THE WORLD

Diversity
of climate
in different
regions

Climatic and Natural Regions.—The same type of climate does not prevail all the world over. Countries near about the equator are generally hot and humid; those in the middle latitudes commonly possess a dry type of climate; the polar regions, again, are cold and arid. Thus, for instance, the climate of Great Britain is quite different from that of India. Not only that; even in the same country different regions may have different types of climate. Thus for example, Sind or Rajputana differs considerably in this respect from Bengal or Assam. But there is another side of the picture, too. It is found, for instance, that the climate of the lands surrounding the Mediterranean Sea is very similar to that of so distant a place as California in North America or to that of certain part of Western and South Australia. And since climate exercises a profound influence on soil and vegetation, regions having similar climatic conditions are also much alike one another in respect of soil and natural vegetation. And what is perhaps more important from the human point of view, agricultural methods which have proved suitable to one of these regions prove to be equally so in any one of the other regions, provided that the economic and other conditions are equal. The products which flourish well in one area will also thrive equally well in another, if the two places agree in climatic conditions. Oranges, for instance, thrive in Spain, California, the Cape Province of South Africa and Western and South Australia. "So there has been evolved the conception of a

Similarity
of climate
in different
regions

Similarity
of climate
associated
with simi-
larity of
soil and
vegetation.

Hence the
feasibility of
employing
similar
agricultural
methods
in regions
having
same type
of climate

series of major natural regions, of major environments."¹ The natural regions are the areas which agree in climate, vegetation and the general method of living. It is one of the most fruitful conceptions of modern geography, and was first enunciated by Professor Herbertson of Oxford, who defined a natural region as 'an area of the earth's surface which is essentially homogeneous with respect to the conditions that affect human life.'² It has now been found that the entire land surface of the earth may be divided into nearly a dozen well-marked areas, which can be defined either in terms of climate or of vegetation.³ But before proceeding with the detailed description of these regions we must note that, these divisions are not like watertight compartments; no sharp line can be drawn to mark off one region from an adjacent area, one type generally tending to merge by degrees into another. And since the change is very gradual and not quite abrupt except in regions sharply outlined by such natural barriers as oceans and mountain ranges, much of the intervening tract between two regions can best be regarded as a transitional area. The physical conditions, moreover, of two widely separated places are not fully identical, and since location and physical features have well-marked influences on the climate of a place, considerable local variation is seen even in areas grouped together as forming one natural region. A classification of natural regions primarily on a climatic basis can at best be only an approximation, and the placing of regions

Natural regions.

Division of earth into about twelve natural regions

Divisions not like watertight compartments

¹ Stamp, *A Commercial Geography*, p. 11.

² Herbertson, "Major Natural Regions: An Essay in Systematic Geography," *Geographical Journal*, Vol. XXV, p. 300 ff.

³ Geographers are not, however, in complete agreement as to these divisions. What one regards as a major type another merely looks upon as a sub-type. Yet the basic principle has remained the same since Herbertson's enunciation of the conception of natural regions.

Perplexities
in naming
natural
regions

in a particular category means that they have more resemblances than differences in common. In naming these regions geographers, however, try generally to keep close to the dominant character of the climate in each. But since the influence of climate on vegetation is most intimate, a specified region is sometimes named after its prevailing vegetation. Thus, for instance, we have such names as Temperate Grassland or Prairie and Coniferous Forest Belt for regions having a Temperate Continental Climate and a Cold Temperate Climate respectively. Sometimes, again, natural regions are named after a place held to have quite typical climatic conditions. Thus there are regions with a China type of Climate or the Sudan type. But we must always remember that the climate—not place—is the chief factor here; vegetation though important is largely dependent on it. So it is desirable to use climatic names. And if still natural regions must have 'regional' names, it is better to christen them after the climatic zones of the earth than after place-names having little, if any, real geographical value.

1. REGIONS OF LOW LATITUDES

Extent

1. The Equatorial Regions.—The Equatorial Regions, as the name implies, stretch almost as a continuous belt on both sides of the Equator between 5° N. and 5° S., and occupy an area of about 600 miles in width encircling nearly the entire land surface of the earth. The range, however, is often wider; but the extreme limits rarely exceed 10° N and 10° S. We can easily distinguish three main regions within this belt:

- (1) *The Amazon Basin of South America;*
- (2) *The Congo Basin of Central Africa; and*
- (3) *The islands of South-Eastern Asia together with the adjacent areas of the mainland.*

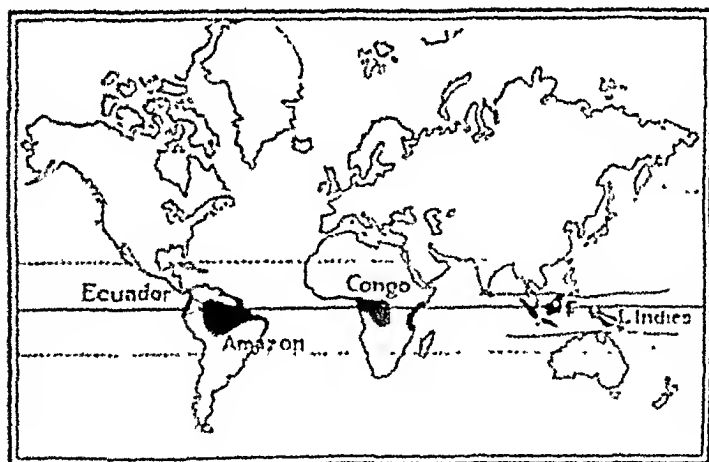
Parts of Ecuador to the west of the Amazon Basin and the narrow coastal plain adjacent to Mombasa, Zanzibar and Dar-es-Salaam in East Africa also belong to this group.

But what is the basis of this classification? That, of course, is climate--and natural vegetation. The climate prevailing throughout this wide area is characteristically known as the *Equatorial Climate*. It is typical, however, in the basin of the Amazon; hence the name '*Amazon type of Climate*'. It is also described as the climate of the hot wet selvas, because the Amazon forests are locally known as the selvas, a name given to it by the early Spanish settlers in South America. The temperature of this region is high all through the year; the average range, especially in the typical areas, is extremely constant, fluctuating only between 78°F

Basis of classification -- climate and vegetation

Amazon type.

Characteristics.



THE EQUATORIAL REGIONS

Often also called Tropical Rain Forest Regions. The transitional nature of some of the adjacent areas should be borne in mind. Some writers would include the Guinea Coast of West Africa as well as the West Coast of India in the Equatorial Regions because the forests are much similar.

(a) Temperature

and 80°F ; and the seasonal range is usually only 5°F ., and often less. The coldest month can, thus, scarcely be distinguished from the hottest. The diurnal range is also small, —usually less than 20°F ., often even less than 10°F . But we should not suppose that these are really the hottest parts of the world, for although the temperature is uniformly high all the year, it seldom rises above 100°F ., and mostly does not rise above 90°F ., and on the other hand it does not, as

(b) Rainfall

a rule, fall below 70°F ¹. These are the regions of 'rain-at-all-seasons'; hence there is no typically 'dry season' except in a relative sense. Since the Equatorial lands lie, in the main, in the Belt of Calms or Doldrums, the rains are mostly convectional. As the sun shines almost vertically overhead it brings about, in the early part of the day, rapid evaporation and an upward current of air; thus clouds form easily, and frequently there is a heavy downpour in the evening, accompanied by thunder, by the late evening the sky is clear again.

(c) Seasons.

But although rain falls all the year round in these regions, there are periods of maximum precipitation: areas bordering on the Equator usually have two seasons wetter than the rest; those lying on the fringes of the Equatorial Belt usually have one such period. This is mainly due to the annual shift of the earth's thermal equator; the wettest season or seasons

¹ Stamp, *A Commercial Geography*, p. 13. "The Equatorial regions are popularly, but erroneously, regarded as the hottest in the world. The average temperature, it is true, is uniformly high, and the constantly damp, steamy atmosphere may be enervating, but the Equatorial climate is far from being the most trying in the world. The absence of really high temperatures—the thermometer rarely rises above 100°F —and the pleasantly cool rains which accompany the sea breezes impart a welcome movement to the air. This is particularly the case in maritime situations . . . where the land and sea breezes impart a welcome movement to the air. The climate is found at its worst in the interior of the great Equatorial forests where the air is absolutely still. The effect of elevation is to lower the average temperature and, sometimes, to result in a slightly greater range."—Stamp, *Asia*, p. 25.

occur, as a rule, shortly after the sun crosses the Equator. The average rainfall for the year ranges from 70 to 80 inches, often it is higher. But regions cut off from maritime (d) Wind influences usually have less rain. Although the Trade Winds and the Monsoon originate in areas north and south of the Equator, the whole of the Equatorial Belt is not cut off from their influence. The fringes of the Belt as well as maritime stations within it enjoy cool breezes, but the interior forest areas are deprived of their beneficial effects. "Typical of the equatorial lands is the Belt of Calms or Doldrums where there is no marked wind or wind direction."¹

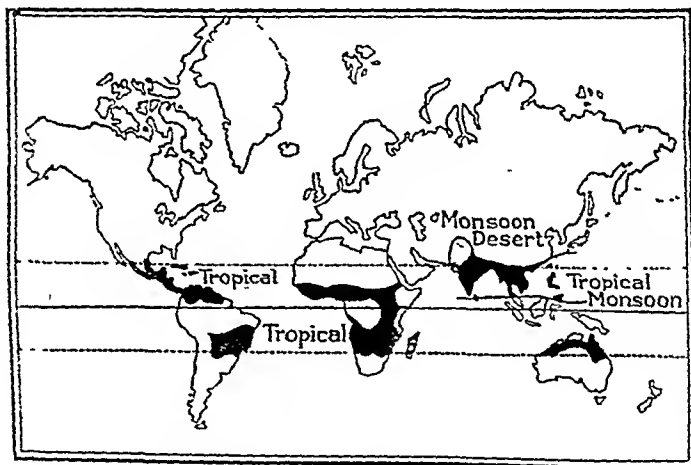
Vegetation is typical. Uniform heat and abundant (e) Vegetation moisture induce a luxuriant growth of plants; vegetation is much more profuse in the Equatorial Regions than in any other part of the world. Where the lowlands are rain-soaked throughout the year, the earth is often so smothered by growing vegetation that the sunlight scarcely reaches the forest floor. There is, thus, a 'fierce competition' for light and air, resulting in the growth of giant trees, with enormous crowns of leaves at the tops. This is particularly well marked in the Equatorial Forest regions of South America—the celebrated Amazon Basin; those of Asia and Africa are comparatively open. Most of these trees, no doubt, have periods for shedding their leaves; but these are of short duration, and the shedding periods of different species come at different seasons of the year; so no forest is ever appreciably bare of leaves, and hence the name 'Hot Wet Evergreen Forests.' The trees are—nearly all of them—of the hard-wooded species. And two major difficulties prevent their thorough exploitation,—(a) the great variety of the trees, and (b) the character of the timber. It is extremely difficult and expensive to extract a particular (f) Difficulties in exploiting forest products.

¹ Stamp, *A Commercial Geography*, p. 13.

Sudan
type

of Africa is commonly said to be typical of them; hence the name '*Sudan type of Climate*'. And since the typical vegetation is grass interspersed with scattered trees, it is often called '*Tropical Grassland Climate*'. It is very interesting to note that the vast stretches of tropical grassland lie between the Equatorial Forests on the one hand and the Hot Deserts on the other. The temperature of these regions during the summer months often even exceed that of the regions lying within the Equatorial Belt. But the chief point of contrast lies in the great seasonal range of temperature. Areas lying close to the Equatorial Belt as well as maritime stations,

Tempera-
ture



The Tropical and Tropical Monsoon Regions Compare the map with that of p 17, and note the 'transitional' areas. The areas like the Gunea Coast and the West Coast of India with their 'equatorial rain forests' belong to sub-division (a) of p 2

where precipitation is naturally heavy, experience small variation of temperature between the hottest and the coldest months; but in the drier parts of the Tropical Belt there is frequently a seasonal variation of 30°F,

or even 40°F. Correspondingly the diurnal range of temperature in these drier regions is also appreciably large. But these variations admit of several gradations because of differences in local conditions; hence any attempt at giving an average figure for the whole area would be misleading.¹ Rainfall also shows a corresponding variation. In some of the wettest parts it may be as much as 200 inches a year, sometimes even considerably more; others have an average of 70 to 80 inches; whereas on desert borders it may be 15 inches or less. What especially distinguishes the Tropical Belt from the Equatorial Belt in respect of rainfall is the presence in the former of a distinctly dry and a distinctly wet season. Geographers and climatologists generally distinguish three seasons—(a) a cool dry season, (b) a hot dry season, and (c) a rainy season. The cool dry season is followed invariably by the hot dry season, when generally unbearable heat reigns supreme and some of the highest temperatures of the world are recorded; then set in the rains, which result in considerable cooling of the atmosphere, as soon as the rains are about to be over it becomes a trifle hot again, but the heat never reaches its maximum owing to the advent of the cool season. The spring and the summer are the seasons of precipitation, and the winter is almost wholly rainless. The hot season in the Northern Hemisphere terminates about April or May to be followed by the wet season. Rains begin to be scarce by the end of August, sometimes even earlier, and about the middle of the following month they have generally ceased altogether. Winter then follows close upon the heels of the rainy season. The typical vegetation, as already mentioned, is grass inter-

¹ In the Indo-Gangetic plains an average of 85°F. to 95°F. is frequently recorded in the summer months, and along the margins of the Steppe even 115°F. has been recorded as an average. See G. W. Kendrev, *The Climates of the Continents*, p. 103 & 127.

persed with scattered trees. This is because grass springs up easily where there is a fairly good supply of rain-water, and it has a resting period during the dry seasons (winter and summer). But trees generally require a fairly constant supply of water all the year, and very many species cannot flourish during the dry seasons.

Man

Hunting and cattle farming are said to be the dominant occupations of the savana people. But agriculture is by no means of lesser importance, since "the natural grass which flourishes in the savana may be replaced by the cereal..."¹ Maize and millets amongst the cereals as well as cotton, sugarcane, groundnuts and various oilseeds are widely cultivated in these regions generally. But at present there are formidable difficulties in the way of the development of many of these regions. Of these the shortage of labour probably comes to the forefront; the grasslands are mostly very thinly populated; those of Australia are practically uninhabited, and in many parts of the African savanas the population is scarcely 20 to the square mile, in the South American grasslands, again, the density is only four persons per square mile. Other difficulties generally are the poor transportation facilities, distance from the markets, and, especially in South America, frequent political unrest and the consequent revolutions.²

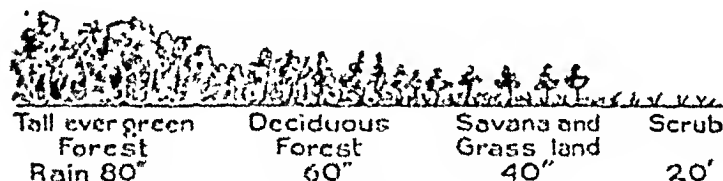
Character-
ization and
Extent

3. Tropical Monsoon Regions.—There is very little difference between a Tropical Grassland climate and a Tropical Monsoon climate, except in respect of rainfall. In winter, Monsoon lands are under the influence of normal Trade Winds. In early summer the situation of the regions, on the fringe of the great land masses, causes the land to be greatly heated. Thus the low pressure in summer leads

¹ *op cit*, p 19.

² H J Morans, *Up the Orinoco and Down the Magdalena*, p 128

to the reversal of the Trade Winds. Moist and cool winds from the sea are drawn towards the land, and they bring heavy rains. Hence the Tropical Monsoon regions are lands of heavy summer rainfall. The winters lasting from November to January, have very little rain. The rains break in by the end of May and last till October. The rainfall in the monsoon lands depends largely on surface relief. India is the most typical of the Tropical Monsoon lands; even the areas falling strictly outside the Tropic of Cancer are governed almost wholly by the Tropical Monsoon Climate.¹ Besides India, Indo-China and South China, the Monsoon Climate is found in a part of the East African coast just south of the Equatorial Region there, in Madagascar and in the north-west coast of Australia. In a lesser degree it is found also in the coastal regions of the north-west of South America and Central America. The Monsoon lands may be divided, after Stamp, in the following four groups:—



1. TROPICAL AND TROPICAL MONSOON REGIONS.
GRADATION OF RAINFALL AND VEGETATION IN TROPICAL LANDS

¹ It is not India does not at all experience winter rain brought by factors other than the Monsoon Winds. Thus during the period between December and March cyclones, originating in the Mediterranean region, travel eastward across Persia, Baluchistan and Afghanistan, and subsequently reach the plains of the Punjab and Sind, bringing in an appreciable rainfall. Usually they die out before reaching the lower valley of the Ganges. The bulk of snowfall in the north-west and in Kashmir may also be traced to these cyclonic disturbances. But this rainfall compared with that caused by the Monsoon is quite small. In certain areas of the Madras Presidency as well as in Ceylon winter rain is caused by the North-East Monsoon. See Stamp, *Arct.* pp. 183-193.

Divisions

(a) *Regions with more than 80 inches of rain annually.*—These are the regions of the evergreen forests closely similar to those of the Equatorial Rain Forests. Rice is the chief food crop of these areas.

(b) *Regions with an annual rainfall of anything between 40 and 80 inches.*—These are notably the areas of the Deciduous Monsoon Forests. Here also rice is the main food crop; but maize, sugarcane and oilseeds are important.

(c) *Regions with an annual rainfall varying between 20 and 40 inches.*—These are usually the areas where thorny thickets and scrub flourish. Millet is the chief food crop in these regions; but where conditions are favourable wheat and barley are cultivated as winter crops. Sesamum and oilseeds are important, and cotton is another characteristic agricultural product.

(d) *Areas with less than 20 inches of rain.*—These are the desert and semi-desert regions. In the semi-desert areas succulent plants are sometimes seen.

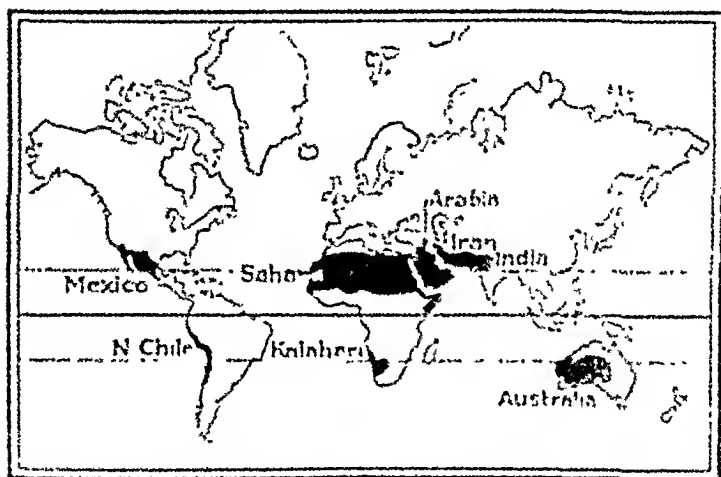
Man

The Monsoon lands are amongst the most densely peopled in the world. This is due to a variety of causes, the chief among which are the ease with which jungles can be cleared, the greater facilities for cultivation and the easier and richer conditions of living. Where the soil is the richest the land may be said to be 'saturated' with people as it is in the Gangetic plains of India. Agriculture forms the major occupation of the people.

Extent.

4. **Hot Desert Regions.**—The Hot Deserts are situated on the poleward margin of Tropical lands. The location is extremely significant. They lie within the high pressure belts and on the western side of the continental land masses—the region of 'Dry Trade Winds'. Hence rain-bearing winds generally fail to reach them; on the contrary,

currents of air descend on them so as to cause the wind to blow outwards. The eastern side of the land masses in the same latitudes are not, however, deprived of some rain brought by the 'moist' Trade Winds. The deserts of Mexico and Northern Chile in America, the great Sahara, the Kalahari and the desert of Somaliland in Africa, the plateaus of Arabia, Iran (Persia), Afghanistan, Baluchistan, the north-western parts of India including Sind, the Thar and Rajputana, and the great desert of Western Australia fall within this group. It is interesting to note—and the fact is



THE HOT DESERTS OF THE WORLD
Note the poleward and equatorward margins.

highly significant too—that almost a continuous stretch of desert extends from north-western India to the west coast of Africa,—an area considerably larger than the U. S. A.; it is broken only by the intervening narrow waters, the total 'Sahara type' extent of which is quite insignificant in comparison with the vastness of the desert land. The great Sahara has induced

all of them are well protected by means of sharp pines and thorns,—a feature which is supposed to have evolved for preventing the animals from eating them up. These Hot Deserts are generally divided into two groups according to the characteristic vegetation of each—

(a) *Dry Grasslands*,—which intervene between the desert proper and tropical grasslands,

(b) *Scrublands*,—intervening likewise between the desert proper and the Mediterranean regions.

The *Oases* may loosely be earmarked as another class. These are fertile areas scattered here and there throughout desert regions, and are usually situated in hollows where the underground supply of water reaches the levels immediately below the surface and is, therefore, easily accessible to vegetation. The date palm is typical of these regions. But from the point of view of natural vegetation proper, the oases are not a class apart. An oasis may be a small patch of land with a pool or well, or may be a fairly extensive area.

Man

The deserts, as can easily be imagined, are very sparsely populated; but an oasis often contains a large population because, no doubt, of its fertility. The desert people are commonly divided into three groups according to their occupations and habits:

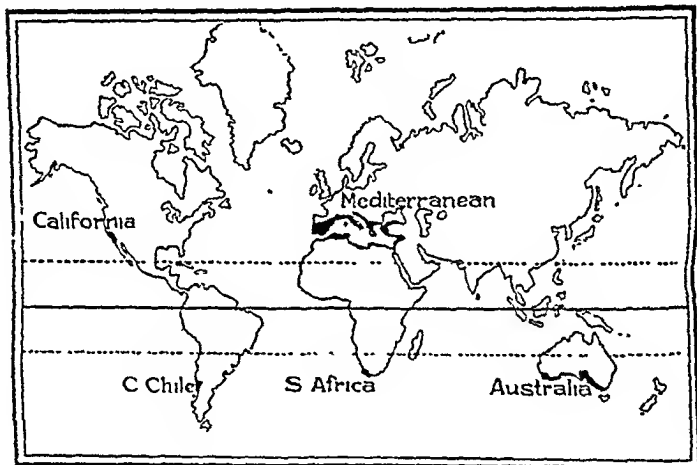
(a) *The Nomads*, who are almost perpetually on the move with their camels and scanty belongings. They are—most of them—robbers, hunters and tenders of flocks and herds, all in one. But they are traders too; they often act as carriers of goods from one desert region to another, and thus work as middlemen between peoples living in different oases.

(b) *The Settled Peoples*,—who are restricted to the oases, which are of various kinds. They are mainly agriculturists.

the eastern and the western margins of the continental land masses at once engage our attention. Thus we are led to abandon the method of surveying the world as a whole.

Extent and
character-
istics

5. **The Mediterranean Regions.**—The Mediterranean regions lie outside the Tropics and are situated on the western margins of the continental land masses roughly between the latitudes of 30° and 45° both north and south. They are fringed on the side of the Equator by the Hot



THE MEDITERRANEAN REGIONS

Note that these regions are situated on the Western margins of the continental land masses. Compare them with the regions lying on the eastern side of the continents in the same latitudes

Deserts, and like the latter are hot and dry in the summer months, because the Trade Winds throughout the season blow off-shore. In winter, however, these regions come under the influence of the Westerlies, because of the shift in the earth's thermal equator, and thus receive moisture. The

Mediterranean lands are, therefore, known as the 'winter rain' regions.¹ Dry summer and wet winter are the chief characteristics of these regions. Besides the lands surrounding the Mediterranean Sea, (S. Spain, S. France, S. Italy, Greece, Asia minor, and North Africa), California in North America, Central Chile in South America, the south-western parts of the Cape Province in South Africa, and the south-west of Western Australia, South Australia and a part of Victoria (Australia) belong to this group. The position of these regions is also significant: the Mediterranean climate cannot prevail except on the western margins of the continents, because the eastern margins receive their rain mainly in summer from the Trade Winds blowing from the oceans; but the Westerlies blowing from the land are moistureless. Although the Mediterranean Regions are fringed by Hot Deserts on the side of the Equator, and agree in being dry throughout the summer, they lie within the Temperate Zones; hence despite their bright sunshine they are considerably cooler. But they exhibit also great local diversities. The mean temperature in July is over 70°F. in certain areas and over 80°F. in others. Precipitation also shows a corresponding variation, the typical average being between 10 and 40 inches annually; on exposed uplands the rainfall is often heavier than 40". The vegetation is also characteristic. Since the plants must protect themselves from lack of moisture during the summer months by utilizing the water which accumulates underground after the winter showers, shallow rooted species, requiring light rains in the spring and early summer, do not, as a rule, flourish. Trees and shrubs capable of

Temperature.
Rainfall.
Vegetation.

¹ It needs hardly to be pointed out that since the Mediterranean Regions lie in both hemispheres, when it is dry in the Northern Hemisphere it is just the reverse in the Southern Hemisphere, and *vice versa*. That explains why we can have typical Mediterranean products throughout the year.

retaining moisture for utilization in the dry season do, therefore, prevail, and the Mediterranean Regions are, thus, clothed naturally by evergreen trees and shrubs. Most of these have developed special devices for holding moisture. The olive has leaves provided with fine silky hairs to prevent excessive evaporation; the vine has developed enormously long roots; a few other species of trees have leaves with a coating of wax to prevent rapid transpiration. Typical ground vegetation of the Mediterranean lands are the various species of flowering shrubs and herbs which generally take the place of grasses. Where the supply of moisture is sufficiently abundant, fine forests grow, and the chestnut and the cork oak trees occur in large numbers. The fairly long dry summer with bright sunshine for the greater part of each period of twenty-four hours is said to be ideal for the ripening of fruits, and the Mediterranean Regions are commonly very suitable for the production of a variety of them: thus oranges, lemons and the grape-fruit among the citrus variety are abundant; peach, pear, apple, apricot and nectarine belonging to the deciduous type are also equally plentiful; the olive, almond, fig, mulberry and vine are by no means less important. Of grains certain types of wheat and barley are important. Irrigation has played a large part in the commercial history of these regions, because rainfall is not generally sufficient for the raising of as much crop and fruit as is deemed essential by the modern man for economic and commercial purposes. The Mediterranean lands of Europe were the cradles of the civilisations of Greece, Rome, Crete and Carthage.

Extent.

6. The Temperate Desert Regions.—These occupy enormous tracts of land in the interior of Asia, Europe, and North America, as well as in the Patagonian Desert region of South America, and are situated, generally speaking, within

the belts where high atmospheric pressure is formed in winter and low pressure is generated in summer. These regions are flanked, especially in the Northern Hemisphere, by lofty mountain barriers which cut them off from oceanic influences, and their distance from the great oceans of the world is, as a rule, sufficiently vast to prevent any such influence from entering them. High ranges of temperature and low rainfall generally characterize these desert regions. Rainfall occurs commonly in the summer, except in regions bordering on the Mediterranean lands which, of course, receive winter rain. The enormous stretch of land falling within this division naturally presents a marked variety of topographical features; and since topography has profound influence on climate, these regions may be easily subdivided into various types, of which the chief ones have thus been enumerated:

Temperature
and
Rainfall.

(a) *The Iran Type*,—which really forms a transition between regions enjoying a Mediterranean Climate on the one hand and the Hot Desert Climate on the other. In winter it is intensely cold; the mean January temperature is only slightly above the freezing-point; at night sharp frosts occur, and the temperature often sinks below the freezing-point. In summer the sky is generally brightly clear, the atmosphere dry, and sunshine almost unbearable. The average July temperature in Tehran is 85°F., sometimes even 110°F. Precipitation is almost wholly restricted to their winter months; the annual average rarely exceeds 13 or 14 inches, especially on the plateau region. Often there is a snowfall instead of rain. This type of climate occurs in a few other places, as well, notably in the Salt Lake areas of North America.

(b) *The Tibet Type*,—found on the highest plateaus. The climate is terribly severe; violent winds blow during the

greater part of the year. But what probably is the most characteristic feature of the climate is the enormous difference between the sun and shade temperatures: rocks in the sun are often hot to the touch, while in the shade it may be quite freezing. This has been attributed mainly to the exceptional rarity of the atmosphere. Precipitation is extremely small, and keen frosts are common in autumn and winter. Gyantse which is not very far from Sikkim and Darjeeling has an annual rainfall of only about 8 inches; Lhasa farther north has something like 18 or 20 inches. The precisely Tibetan type of Climate, it should be noted, does not prevail all over Tibet, it being restricted, in the main, to the highest plateaus—regions of 11,000 feet above sea-level. Besides the high plateaus of Central Asia, this type occurs in the Bolivian plateaus of South America at and over similar heights.

(c) *The Gobi or Mongolian Type*,—which, as the name suggests, is the characteristic climate of the Gobi or Shamo desert occupying roughly the central parts of Mongolia. It is the climate pre-eminently of “lower elevations farther away from the equator,”—a climate characterized by very short summers and long chilly winters. The average winter temperature sinks often to 40°F., below the freezing-point and sometimes even to 50°F., below zero. The higher peaks of mountains, such as the Altai, remain covered up by a blanket of snow, except for a few weeks in summer which starts very late and passes away almost as soon as it starts. Precipitation is practically nil, and even in the immediate vicinities “it is frequently concentrated in six weeks of the summer half year. Sometimes there is absolute dryness until the end of June” in the more fortunate regions around.¹ Besides the Gobi region, the basins of Northern Tibet also fall under this group

¹ Case & Bergsmark, *College Geography*, pp 459-60.

(d) *The Turkestan Type*,—occurring mainly on the low-lands of South-West Siberia. The summers are very hot, the usual July temperature being over 80°F.; but the winters are cold for the latitude, the mean temperature in January usually dropping below zero. Precipitation ranges from about 3 or 4 inches to about 6, and a progressive variation is marked towards the east till in the hills it comes up to about 14 inches or more as the figures obtained at Samarkand and Tashkent show.¹ The maximum rainfall is commonly witnessed in the spring. The predominance of winds is a noteworthy feature of the climate; except in the mountain valleys where strong local winds prevail, the whole area is almost swept over by northerly, north-easterly, and north-westerly winds. It is not exactly a desert type of climate, but one of a very dry steppeland.

These Temperate Desert Regions, like the Hot Deserts, have been aptly described as 'regions of lasting difficulty'. Not that the soil, as a rule, is barren; it is rather often potentially quite fertile. But the climatic conditions are unfavourable for crop production and similar pursuits; in many parts even grazing is a difficult proposition. Extreme temperature fluctuations, dessicating winds, destructive hail-storms, and scant and uncertain rainfall, all combine to frustrate human efforts even in the adjoining areas, where conditions are said to be comparatively favourable. These regions, therefore, remain sparsely populated. The greater part of them is used for grazing and men and animals are continually on the move from one pasturage to another. This is especially the

Man in
Temperate
Deserts

¹ It must be noted that in determining aridity or humidity, evaporation is also to be taken into account. Climatologically the same amount of rainfall in areas widely separated from one another does not bring about identical or similar conditions, since where the temperature is high and evaporation rapid there will prevail a relatively dry atmosphere than that of a place with the same amount of rainfall if the temperature and the rate of evaporation differ.

case in the vast tracts of arid land in Inner Asia. Where conditions are suitable or have been made to suit the requirements of man, as in the arid regions of North America, animal husbandry has been started. As in certain parts of the Hot Deserts, so in these Temperate Deserts irrigation sometimes makes the raising of crops possible. So even in these regions people have performed wonders by irrigating the soil in various ways, the water supply is derived from the adjacent highlands. Wheat, maize, melons and fodder for sheep and cattle are fairly largely grown in the irrigated areas.¹ In the irrigated parts of arid South America both the vine and the sugar-cane are important. But the desert areas proper have large tracts of land either too rugged or too high in salt content to make agriculture by means of irrigation quite profitable an enterprise. Temperate Deserts sometimes contain various minerals, and where these occur man has responded in his characteristic way.

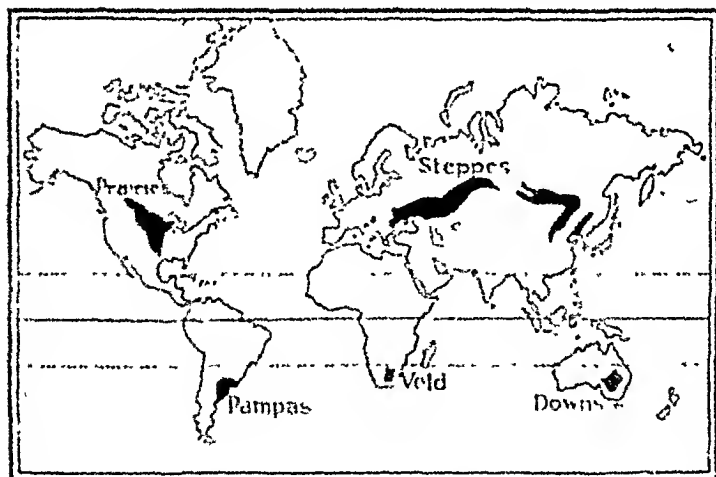
Extent.

7. Mid-latitude Grassland Regions.—Theoretically these would occur in the heart of the continents where a Temperate Continental type of Climate prevails, and the more extensive Temperate Grasslands of the world actually do occur in the mid-latitude interior of North America and Eurasia. The Prairies of North America and the Steppes of Southern Europe and Southern Siberia are the outstanding examples. In the Southern Hemisphere we would not normally expect to find similar grasslands, because the land masses are so much narrower as to permit oceanic influences to enter them. Yet this is far from being the case, the Pampas of South America, the Veld of South Africa, and the Downs of the Murray-Darling basin of Australia also belong to this group. What may the explanation be? In

¹ E. H. Carrier, *The Thirsty Earth*, p. 108.

South America the Pampas, though not far removed from the seas, are effectively cut off by the High Andes from the Westerly Winds of the South Pacific. The South African Veld owes its origin largely to the high elevation of the plateau—a factor that greatly modifies the oceanic influences brought about by the South-East Trade Winds. The Great Dividing Range of Australia, again, interferes with the oceanic influences penetrating into the Downs. But these Temperate Grasslands of the Southern Hemisphere exhibit certain well-marked differences from those of the Northern Hemisphere, owing chiefly to their nearness to the seas. These are temperate lands not so much for the general mildness of the temperature as for being situated in the Temperate Zones of the earth—in the Middle Latitudes. A Continental type of Climate, we should never forget, is characterized by sharp contrasts, especially between the summer and winter temperature. Summers are, therefore

Tempera-
ture



MID-LATITUDE GRASSLANDS

Note their position in relation to that of the Temperate Deserts.

Rainfall

exceedingly hot; no cooling breezes from the sea penetrate them. Consequently the average summer temperature rises over 60°F., often it is above 70°F., and sometimes even higher. But the summer is usually short, rarely exceeding three months in the year. Winters are long and difficult; neither warm Westerly Winds nor warm ocean currents are there to counteract their severity. The average winter temperature falls below zero. This extreme continental type of climate does not, however, occur in the Southern Hemisphere because of the narrower land masses. Rainfall comes mainly in the spring and summer, because as the land gradually begins to be heated in spring, low-pressure centres are formed, and winds begin to rush in from the ocean, laden with moisture, causing a moderate rainfall. Since various local factors govern the actual amount of rainfall in each region, it is difficult to give exact figures that would hold good for all the regions. In typical regions precipitation varies between 10 and 30 inches. In the cold regions of the N. Hemisphere the rainfall in winter takes the form of snow. The natural vegetation is grass. The light spring showers are ideal for the growth of grasses. These Temperate Grasslands, are, as a rule, treeless, because the characteristic light rain is not suitable to trees; and the grass is usually softer and less coarse than that of the Tropical Grasslands.

Animal life.

The animals, as in the latter, are of two kinds—swift-footed grass-eating animals, represented by the antelope, the horse, the bactrian (two-humped) camel, the bison, the kangaroo, etc., and the carnivorous such as the wolf, the coyote, wild dogs, etc., “amongst which man must really be classed”¹

The mid-latitude grasslands have been chiefly devoted

¹ Chisholm's *Handbook of Commercial Geography*, p. 41.

to grazing, and in most parts of these regions live-stock and their by-products constitute the main source of wealth. Of all domesticated animals the sheep is the most important, because having been provided with cleft lips and covered by bushy fleeces they can live on short grasses so as to survive periods of drought and withstand the long and severe winters better than cattle. Thus the Pampas, the Veld, the Downs, the European Steppes (as well as some other places not falling within this group of regions) contain large numbers of sheep. The Canadian and Russian Prairies are not, however, suitable for quite successful sheep-rearing, though in and about the Prairie region of the U.S.A. a good number of sheep are well tended. The Steppes of Asia as well as of some adjacent areas contain large number of sheep, but the figures are relatively small per square mile. Cattle are also important, particularly in the Argentine and Uruguay, though far less distributed than sheep. Their number is also smaller than in the humid parts of the Middle Latitudes, and even in the grasslands they are distributed mainly in the wetter regions, because it is difficult for them to subsist on short and hard-fibred grasses. Although the Temperate Grasslands, particularly of the Southern Hemisphere, are still primarily sheep-rearing areas, agriculture is fast increasing in importance. Many of these regions are well irrigated, and are under crops; excepting the dry grasslands of Mongolia and Manchuria all these regions—the Prairies, the Pampas, the Veld, the Downs—are now fairly well developed; the chief crop is wheat, except in South Africa where maize is of prime importance; barley, oats and rye are important. Thus "the Temperate Grasslands have the world's granaries, from which the deficient industrial countries are made up"¹ With this

¹ Stamp, *A Commercial Geography*, p. 29

Human
settlement.

of crop production has also come a revolution in the meat industry of these regions, because the huge ranches are steadily being broken up in order to make room for wheat farming.¹ A distinctive feature of these semi-arid regions of the Middle Latitudes is their frontier character; human settlements thus penetrate gradually along the fringes. Thus in all these regions settlement is still in progress.

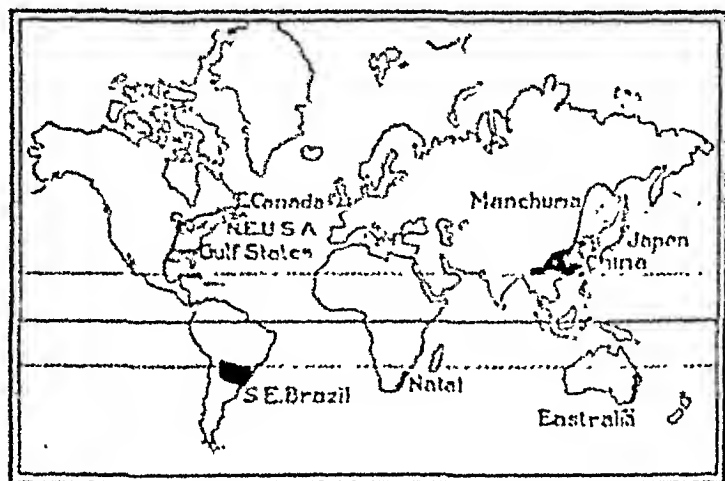
Extent.

8. Mid-latitude East Coast Margins—The lands of the Mid-latitude East Coast Margins lie in the same latitudes generally as the regions having a Mediterranean type of Climate, but on the eastern side of the continents. These bear certain resemblances in temperature to the Mediterranean regions, but an important point of difference is that the rainfall in these eastern lands comes mainly in summer. The climate is often called Warm Temperate and the lands Warm Temperate Regions. But as in the so-called Temperate Grasslands so even in these regions the climate is often characterized by sharp seasonal contrasts. Moreover, these regions do not possess a single type of climate in the sense in which the Mediterranean regions have a single type.² But of course these different types agree in the fundamentals as do the various types prevailing in the Temperate Desert Regions. That is why they are generally grouped together under a common name. The Gulf States of the U S A, South-Eastern Brazil, Natal in Africa, the eastern half of China, and the southern parts of the East-Australian coasts are typical of these regions; whereas the north-eastern parts of the U. S. A, parts of the eastern coastlands of Canada, Manchuria and Japan belong to different sub-types of the main group. And yet there are considerable regional variations even in the

¹ Ibid

² Stamp, *A Commercial Geography*, p 29

typical lands. These Mid-latitude East Coast Margins have been thus divided by Stamp.¹



LANDS OF THE MID-LATITUDE EAST COAST MARGINS.
Compare with the map on p. 43.

(a) *The South-Eastern States of the U. S. A.*—These are the celebrated cotton-lands of the States, and have a moderate rainfall all the year, though the summer months experience a maximum because of the low-pressure centres formed by the heat in the heart of the continent.

(b) *Northern and Central China*,—which really fall within the great Monsoon region of Asia as does India. But there is so marked a difference in climate as to merit a separate name—the China type of Climate.² The rainfall of course is due to the formation of low-pressure centres which attract moisture-laden winds from the ocean as it is

¹ Stamp, *A Commercial Geography*, pp. 20-32.

² Southern China comes under the Tropical Monsoon Climate like India and Indo-China. See Stamp, *Asia*, p. 27.

the case in India and other Monsoon lands. And it is summer rain, too. But the winter is terribly severe in Northern and Central China, because of the dry winds blowing from the heart of Asia. Snow is quite common in winter even on the plains. In Northern China even the greatest rivers often become frozen in winter. Some amount of winter rain also occurs, particularly in the coastal areas. This China type of Climate may, again, be divided into three sub-types:—

- (i) Northern China type, represented by the climatic conditions of Peking;
- (ii) Central China type, represented by the conditions prevailing in Shanghai and Hankow;
- (iii) Japan type, which is mainly due to the insular position of Japan, typified by the climatological figures obtained at Tokyo.

The principal grains of Northern and Central China are wheat and millet, while rice is the all important food crop of the south. Cotton is a leading crop in Central China.

(c) *The South-Eastern Coastlands of Australia*,—the climate of which has received a new name—the *Eastralian* type of Climate. The rainfall occurs all the year round with, of course, a summer maximum, which is due chiefly to the Trade Winds. In winter some influence of the Westerlies is also felt. It differs from the China type of Climate chiefly in two particulars,—the winter is much milder, and the rainfall is not monsoonal. The normal vegetation is the eucalypt forest.

(d) *The Natal region of South Africa*,—where the climatic conditions are somewhat similar to those of the seaboard of New South Wales in Australia (south-eastern coastlands). Rainfall is light, but occurs intermittently at

all seasons, with a maximum in summer. It is caused by the Trade Winds. The coast is kept warm in winter by warm currents. Warm Temperate forests occur.

(c) *The region of Uruguay and South-Eastern Brazil*,—where, again, the climatic conditions are somewhat similar to those of the south-eastern coastlands of Australia, but more particularly perhaps to those of the Natal region of South Africa. Rainfall is fairly good, and occurs mainly in summer, due to the Trade Winds. There is an warm ocean current along the east coast, keeping it warmer than the west coast. Warm Temperate Forests occur here also. Thus the climatic conditions of the Mid-latitude East Coast Margins in the Southern Hemisphere are, on the whole, similar.

It will be clear from a general survey of these regions that the natural vegetation, despite all local variations, is everywhere characterized by the presence of tall trees; and where rainfall is well distributed evergreen forests also occur. These evergreen forests have well been described as 'Warm Temperate Rain Forests,' and are said to rival the Equatorial Forests, though naturally these are much less dense.¹ Palms and tree ferns are characteristic of many of these forests. The outstanding feature in the Gulf States of North America is the presence of both broad-leaved and coniferous forests, and pitch pine is obtained from the latter. The Mid-latitude East Coast Margins are said to be eminently suited to human occupation and development.² Thus Central China is almost saturated with people, and is one of the most densely inhabited agricultural lands of the world with a density of 3,000 or more per square mile. Rice, cotton, tea and silk are the principal products. The Gulf States of the U. S. A.

General
character of
Vegetation.

¹ Stamp, *A Commercial Geography*, p. 31.

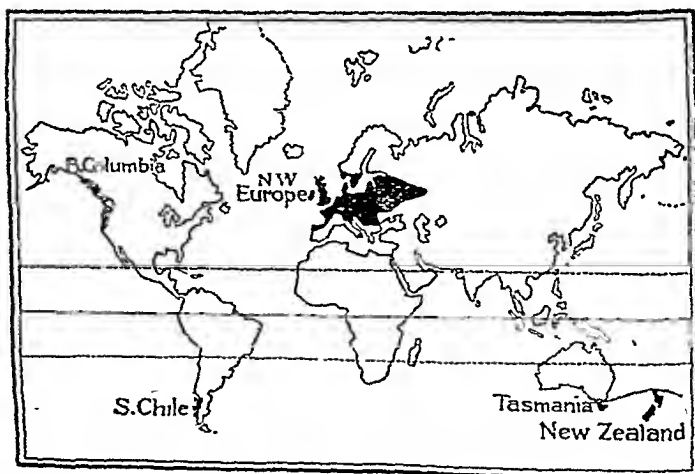
² Chisholm's *Handbook of Commercial Geography*, p. 43

have been aptly described as 'the world's storehouse of cotton'; and the famous Maize Belt of North America lies immediately to the north. The sea-board of Eastern Australia as well as the coastal region of Natal in Africa has witnessed the migration of large number of people in recent years. In the heart of South America, however large tracts of these forest lands yet remain to be penetrated because mainly of their swampy and unhealthy character¹

III. THE REGIONS OF HIGH LATITUDES

Location

9. The Deciduous Forest Regions.—These occur mainly on the western margins of the continental land masses like the Mediterranean lands, but on the poleward side of the latter. For this reason these areas are known as the 'West European' type of natural region. The climate is also referred to as the "West Marginal type of Climate." Another



DECIDUOUS FOREST REGIONS.

¹ Ibid.

significant fact about the location of these regions is their situation within the Westerly Wind Belt. As the lands surrounding the Mediterranean Sea constitute the largest and most typical of the Mediterranean regions of the world, so the largest area belonging to the Deciduous Forest group is North-Western Europe. The north-western coastlands including British Columbia form such a region in North America. In the Southern Hemisphere a small tract in southern Chile, and the islands of Tasmania and New Zealand in Australasia belong to this group. Since the regions lie in the poleward sections of the Temperate Zones, and are in the closest possible proximity to the oceans, the climate prevailing in them is often called 'The Cool Temperate Oceanic Climate.' Since these regions lie in the belt of the Westerlies, rainfall throughout the year and small seasonal range of temperature are the chief characteristics of the climate. But rain throughout the year does not mean that these Deciduous Forest regions are comparable with the Equatorial Regions. The Westerlies are extremely variable and by no means as steady as the Trade Winds. Hence cyclones and anti-cyclones are a distinguishing feature of the weather. These are par excellence the oceanic or marine lands of the world. In Europe, this marine type of climate reaches far to the north, mainly because of the drift of warm waters—a continuation of the famous Gulf Stream—which is not retarded by land barriers. Thus the shores of the British Isles and North-Western Europe are kept warm and free from ice even in winter. Eastwards, however, the winters are, in the main, progressively colder and summers correspondingly warmer, because of the relative distance of the regions from the sea. That is why geographers frequently distinguish two sub-types of this climate in Europe:

Temperature and Rainfall.

Divisions.

(a) *The North-West European Type*,—characterized by conditions almost typical of the Cool Temperate Oceanic Climate. Summers are cool, winters mild, and rainfall fairly abundant all the year. The average temperature of January is above the freezing-point, making an average of about 40°F. for the whole year. The whole of the British Isles, Northern Spain, roughly the Western half of France, Belgium, Holland, most of Denmark, and the narrow western fringe of Norway come under this sub-division. But conditions in Denmark and the Norwegian fringe referred to are slightly different because of their more northerly location. Denmark, though not farther north actually than the British Isles, is farther east, and less fortunate, therefore, to benefit from the warm North Atlantic Drift which flows along the west coasts of the British Isles towards the North Pole.

(b) *The Central European Type*,—with a January temperature about or below the freezing point. Winters are colder, summers warmer, and rainfall, generally speaking, comparatively light. Thus while some parts of the British Isles, particularly on the west, have a rainfall of over 80", it is as low as 18" in Eastern Germany. Roughly the eastern half of France, Switzerland, Germany, some parts of Northern Italy, practically the whole of the Balkans, the southern parts of Norway and Sweden, etc., fall within this sub-group.

The northern parts of the North American west coast get a good rainfall all the year round from the South-West Anti-Trades (South-Westerlies). It is 80" in the wetter parts, but progressively less eastwards. The warm North Pacific Drift keeps the west coast warm in winter, and when in summer New York on the east is nearly as hot as Bombay, the west coast is kept cool by the influence of the sea. Southern Chile similarly receives its moisture from the

N. W. Anti-Trades (North-Westerlies) all the year round, and is kept cool by the cold Peruvian and the Antarctic Currents. Tasmania and New Zealand also fall within the Westerly Wind Belt; only the extreme northern end of New Zealand, lying in the same latitude as Spain, has a climate somewhat comparable with that of the Mediterranean lands. Rainfall, of course, varies from a maximum of well over 40" in the western parts to about 20" in the east. The maximum in Tasmania is usually over 40", while that of New Zealand is over 70". The climate is oceanic and hence equable.

The natural vegetation of these Cool Temperate regions, like that of the Monsoon lands, is said to be the Deciduous Forest. But the Deciduous Forests of the two climatic regions differ; in the Monsoon lands trees shed their leaves in the hot season as a means of protection against the drought; in the Cool Temperate Regions this resting period comes in the cold season for protection against the oncoming frosts. These Temperate Deciduous Forests generally provide good timbers of the hardwood variety; the timber is, of course, softer and much more easily worked than that of the Equatorial forests. The oak, elm, maple, beech and birch are the typical varieties. But this picture is truer of Europe than of other places: most of North-Western and Central Europe was formerly covered by Temperate Deciduous Forests; but in North America they are a rarity; several types of ever-green conifers reign supreme even in the Cool Temperate Oceanic areas. In Southern Chile, again, Cool Temperate Deciduous Forests occur; but conditions are somewhat different in Tasmania and New Zealand, of which little is definitely known yet.

The Cool Temperate climate is said to be the most conducive to human progress, because it is cold enough to induce man to take to manual work for maintaining bodily

Man.

warmth in winter, nor are the summers so hot as to render outdoor work unpleasant and troublesome. Most of the great industrial countries of the world—Britain, France, Germany, Belgium and Czechoslovakia—are located in this region¹ We are also told that the marine regions have the most invigorating type of climate, and so far as human energy is concerned, North-West Europe, Western U.S.A., and Canada rank the highest. These West marginal lands in the cool temperate zone are known as “regions of effort” as here man is rewarded in proportion to the effort made by him. Most of the areas formerly covered by Cool Temperate Forests, particularly in Europe, are now under temperate cereals like wheat, barley, oats and rye, in the warmer parts we find maize. Fruits are also abundant, and include apples and pears. The Cool Temperate Regions of North America are also said to be equally suited for similar development; but considerable areas of British Columbia are too mountainous for settlement, and the deep valleys separating the mountain ranges are often very thirsty, precipitation in certain areas mounting no higher than 5" a year. New Zealand is also being rapidly developed. Southern Chile, however, still remains quite undeveloped, because rainfall is too much and the region is too mountainous to be developed with profit and ease²

Location

10. High Latitude East Coast Margins.—These regions are confined to the Northern Hemisphere, because the land masses of the Southern Hemisphere are too narrow for the development of the climatic conditions peculiar to the East Coast Margins of the High Latitudes. These regions are located generally in the same latitudes as the Deciduous Forest Regions, but are on the eastern side of

¹ Chisholm's *Handbook of Commercial Geography*, p. 45

² Chisholm's *Handbook of Commercial Geography*, p. 45

the continental land masses. The north-eastern parts of the U.S.A., the Maritime Provinces and the St. Lawrence Valley of Canada comprise this group in North America. In Asia the group is comprised by Manchuria, Amuria,—and probably by those parts of North China which border on them. Though these regions occur in the same latitudes as the Deciduous Forest Regions, these east coasts are not located in the Westerly Wind Belt; so despite the moderating influence of the ocean, which, no doubt, greatly modifies the extremes of heat and cold, these are regions of far lower temperature in winter than are the corresponding areas on the western margins of the northern continents—the Deciduous Forest Regions. Summers are, again, hotter. The two regions may best be considered separately:

General
character.

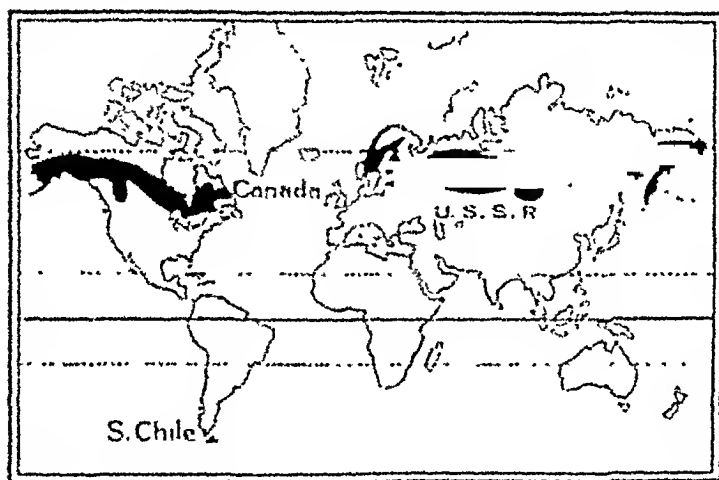
(c) *The Laurentian Type of Climate*,—is found around the mouth of the St. Lawrence in North America, but may be held to extend farther so as to include North-Eastern U.S.A., the Maritime Provinces and the St. Lawrence Valley of Canada. Rainfall occurs all the year round because mainly of the N. E. Trades, and is well distributed. The natural vegetation is woodland or forest consisting of a mixture of deciduous and coniferous trees. Oats, wheat, barley and rye, as well as much potato, are grown, and the people practise mixed farming as in England. The New England States occupying the extreme north-east of the U.S.A., still comprise a similar region of mixed farming. The climate, though less severe than that of the Prairies owing to the proximity of the sea, is extremely cold in winter because of the cold Labrador Current. The St. Lawrence becomes ice-bound for three or four months of the year, and the ports of Montreal and Quebec cannot be used in winter. The ports of St. John and Halifax, on the Atlantic seaboard, however, remain open all the year.

(b) *The Manchurian Type of Climate*,—is often regarded as a sub-type of the China Type. It exhibits close resemblances to the Laurentian Type, but differs from the latter in respect of rainfall, which is essentially monsoonal. It is, moreover, characterized by sharper contrasts because of the greater size of the land mass of Asia. Dairen on the shores of the Yellow Sea has an average January temperature of 24°F , while the temperature rises up to an average of 76°F , in July or August. Harbin farther north, has a January average of about zero and a July average of about 72°F . Rainfall, being monsoonal, is restricted to the summer; but the total rainfall is much less than it is in Japan. Moukden has an annual average of $26.1''$ and Harbin of $18.7''$. Like Montreal and Quebec of Canada the port of Vladivostok remains ice-bound in winter. The climate, though severe, is healthy, and suited particularly to cereal farming. Valuable forests grow; the most important of the timbers is the Manchurian pine, spruce, silver fir, red pine, larch and oak are also obtained in large numbers. As yet forestry has not advanced up to normal expectations. Manchuria is said to be one of the most favoured agricultural spots in the Far East. The chief crops are soya beans, kaoliang, millet, maize, wheat and rice; of these the soya bean is the typical crop, occupying, as it does, nearly a quarter of the total area under cultivation. Manchuria has been witnessing a steady immigration of peoples from the neighbouring lands, particularly from China and Japan, for some time; of the immigrants the Chinese, however, form the majority. It has well been described as a "Land of Opportunities."¹

¹ See *Manchuria, Land of Opportunities*, published by the South Manchuria Railway Co (New York, 1922), and the *Report on Progress in Manchuria, 1907-28*, published by the same company at Dairen, 1929.

11. The Coniferous Forest Regions.—Located northward beyond the Deciduous Forests and the High Latitude East Coast Margins are the vast Coniferous Forest Regions of the world, forming almost a continuous sub-Arctic belt from the north-western confines of Europe to the north-eastern shores of America, broken only in the midway by the narrow Behring Strait. In America this belt includes the forested interiors of Alaska and Canada nearly as far south as the St. Lawrence river, and, though

Location
and
Extent.



THE CONIFEROUS FOREST REGIONS.

farther off from the Arctic Circle towards the east, it touches the southern limits of the Frigid Zone westwards. In Eurasia this belt of conifers embraces the forested areas of Norway, Sweden, Finland, North and Central Russia, and Siberia. In various places it penetrates beyond the Arctic Circle. But the Coniferous Forest Regions are not wholly confined to the Northern Hemisphere alone, although the extent of similar forest regions in the Southern Hemisphere

Tempera-
ture.

is unimportant and negligible. Only the extreme south of South America and the mountains of New Zealand have a climate comparable with that of the coniferous forests of the north. It is well to admit here, however, that thousands upon thousands of square miles of these forest regions remain as yet practically unexplored and unmapped. The average temperature in most places is low, with an annual average of less than 40°F. The seasonal range in places near the ocean is comparatively small; but in the heart of the forest region the climate is of the Continental sub-Arctic type—often called the Cold Temperate Climate, which, like all other types of the Continental Climate, is characterized by an extreme seasonal range. Midsummer temperatures of 80°F, are common, and in many places reading of 90°F, or over have been obtained. In some places a seasonal range of over 100°F, has actually been recorded,—the greatest range in the world. Thus in the town of Dawson on the Yukon temperatures of 95°F., and —68°F, have been registered. A drop of 40° within 24 hours is not also uncommon. The Cold Pole of the earth, as far as our present knowledge goes, really belongs to this region; at Verkhoyansk in Siberia a temperature of —93·6°F, has been registered: this is said to be 20° or 30° lower than the estimated minimum at the North Pole¹. Winters are very long,—nowhere less than of seven months' duration; and summers correspondingly short, being confined to a period of three months where they are the longest, and connected by a month of spring and another of autumn. Winter generally commences in September,—on the poleward margins even earlier,—accompanied by severe frosts and a rapid fall of

¹ But probably the continent of Antarctica has the lowest temperatures, there temperature as low as —24°F in midsummer and —75°F in late spring have been recorded. See Ronald Amundsen, *The South Pole* (1929)

temperature. Along the Yukon in Canada and Alaska, as well as along the Amur in Siberia, sharp frosts occur before the third week of August has elapsed. Snow-storms are common. Thus before the month of November slips away, the forests are covered with the first layer of snow. The advent of spring is heralded by the break-up of the ice on the northern rivers. It is in April that the snow generally begins to disappear; but the growth of vegetation does not commence till May; yet as late as June snow is frequently seen on the wooded northern slopes in North Russia. With the extreme range of temperature there is a corresponding seasonal range in the length of day and night. During the winter nights are long and days correspondingly short. The brief summer again, is characterized by days as long as eighteen or twenty hours or more, with the result that the land warms up to a remarkable degree. Precipitation is small, varying generally from 7 to 15 inches annually, and but for the low rate of evaporation most of these forest regions would be semi-desert. A little less than half the total annual precipitation comes as rain during the three summer months of June, July and August; the greater part of the precipitation comes in the form of snow; this snow-fall, though by no means wholly restricted to winter, occurs mainly in the cold season. There is a progressive decrease of both summer rainfall and winter snow from south to north. The rivers of these regions in the Northern Hemisphere flow in a general northerly direction towards the Arctic Ocean because of the general slope of the land in that direction, and remain icebound throughout the winter. In the spring the upper courses in the warm south melt, while towards the Arctic Ocean it is still winter, with the result that flood waters spread far and wide so as to turn the coniferous forests into a vast forested morass. This is

Vegetation.	<p>particularly true of Siberia. The land surface of these regions reflect the effects of glaciation; continental glaciers moving southwards have scraped off the soil and carved out many a glacial lake basin. Thousands of lakes, as well as swampy lands, are seen in Northern Canada, Sweden, Finland and Siberia. Finland, it is interesting to know, is said to have more than 50,000 lakes of various size, and 12 per cent of her total area is said to be covered by inland waters¹. The natural vegetation everywhere is the evergreen Coniferous Forest or Taiga—"the world's great storehouse of soft-wood timber, such as pine, fir, and deal."² The thick-skinned resinous leaves of these trees are said to be a protection against both cold and unusual loss of moisture. The finest trees are found in the warmer southern parts; farther south the forests pass into mixed hardwood and softwood forests—deciduous and coniferous trees; polewards they pass into the stunted trees peculiar to the Tundra region. The great Coniferous Forest Belt of North America is the most important in the world, the Scandinavian and Russian forests of Europe are less extensive; the timber of the vast Siberian forests is often of a poor quality because of their swampy conditions.</p>
Animal	<p>The animals of these regions are protected from the cold by thick and multi-coloured fur; the silver fox, the patch fox, the Chinchilla rabbit, the mink, and a host of other furred animals were abundant in the past. In the modern world furs are highly prized, especially by women, because of their beauty, style, costliness and warmth. The main fur-producing regions are round the Hudson Bay in Canada and the forest regions of Siberia³. Another important</p>
Man.	
Fur trade	

¹ Case & Bergsmark, *College Geography*, p. 474

² Chisholm's *Handbook of Commercial Geography*, p. 46

³ Fur is not wholly a product of the Coniferous Forest Regions; it is found in the Tropics as well. The port of Bombay, for instance,

industry in these regions is, of course, the soft-wood industry. The timber is required for a variety of uses like building, fuel, mine props, etc., but the production of wood-pulp for paper is rapidly outweighing all. The trees are felled in the winter, and are dragged over the snow to the rivers, whence they are carried to the saw-mills when the snow melts. Many of the soft-wood forests of the world have been depleted; large reserves now exist only in Canada and Russia. These forest regions are generally good sources of water power. The land surface, being dotted about with innumerable glacial lakes, provides natural catchments and storage basins for the rivers, most of which run along the slopes in a series of rapids and falls. These conditions make possible the construction of hydro electric plants, and with them the growth of manufacture. Another factor contributing to the growth of industries is the abundance of raw materials—especially wood and minerals. Northern Canada has valuable deposits of gold, silver, copper, nickel, zinc, cobalt and asbestos. Northern Scandinavia is celebrated for high-grade iron ore, some of which contain as much as 60 per cent., pure iron. The extreme shortness of summer conditions in these regions is insufficient for the ripening of cereals; nor is the glaciated soil fertile enough for crop production. But since the loss of moisture is small the production of some of the hardier crops is possible in certain areas. Thus some oats and barley are grown in specially favoured spots; but agriculture in these regions will always remain a minor industry.

Soft wood
industry.Power and
Mann-
facturing

Minerals.

Agriculture.

exports large shipments of fur every year, these are obtained mainly from the mountainous tracts of Asia. Many of the best tropical pelts are, however, collected in high altitude where the atmosphere is much similar to that of the cold north. Argentina, Paraguay and Uruguay also export furs through Buenos Aires. Best furs are, however, obtained from the colder latitudes.

is -54°F in mid-winter. The Arctic regions of east central Siberia are, however, colder; but the coastal regions of Norway in the same latitude are 40° to 6° warmer than the east central regions of Siberia, owing, no doubt, to the warm winds and ocean currents from the Atlantic. Though the sun is never very high above the horizon in summer, it shines for many days together, with the result that the land has scarcely any time to radiate the accumulating heat in course of the exceedingly short nights. The atmosphere consequently is extremely hot for the latitude: a temperature of 90°F . is not uncommon in the lower Tundra, and in some places a shade temperature of even 100°F ., has been recorded. Precipitation, as in the Hot and Temperate Deserts, is almost non-existent except for occasional snow-falls which at times assume the proportion of snow storms. The Westerlies (Anti-Trade Winds), it is interesting to note, acquire a spiral movement as they sweep poleward; this movement about either pole is known as the 'circumpolar whirl;' and since the whirling wind has an inevitable tendency to rise the polar regions are, contrary to our expectation, area of low barometric pressure although the temperature is very low. The air, thus rising above the poles, moves equatorward, and settles to the surface in the Horse Latitude Belts. From the Horse Latitudes it moves to the Equator so as to merge into the regular Trade Winds, thus establishing a perfect circulation.² The Polar Regions are too cold for forests. The natural vegetation in the Arctic Tundras is moss and lichen, with small bushes and stunted trees near about the Coniferous Forest Belts. Grass and herbs are also not rare. But the soil, as well as the climate, is almost totally unfit for the raising of crops. The richness of summer vegetation, too, has little economic value.

Precipitation

Vegetation

² J F Chamberlain, *Geography*, p 56

The most notable animals of this Tundra Region are the musk ox and the caribou or reindeer. Hares and lemmings are also important. Among the carnivores the celebrated polar bear reigns supreme despite his numerical weakness. Wolves and foxes are found in larger numbers. The seal, the walrus, the whale, as well as several kinds of fish and birds, are found in the adjoining seas and the coastal lands of both the polar regions. Life in the polar regions, it needs no mention, is as hard as it can be. And yet man has braved the hardships as well as the dangers. The Eskimos, the Lapps, the Samoyedes, the Yakuts, are the actual inhabitants of the Arctic regions. But the population is naturally very small. The chief occupations of the people are hunting, fishing, and tending the reindeer. The white man has introduced mining and reindeer farming in some places, especially in Alaska. The Government of the U.S.A., have done much for the development of the Arctic region of Alaska, and the Second Five Year Plan (1933-37) of the U.S.S.R., has also done much to develop the possibilities of the Siberian Tundras. It seems not unlikely, therefore, that these regions have fairly good possibilities in the future. Yet they must remain relatively undeveloped for an indefinite period hence, if not for all time to come.

STUDIES AND QUESTIONS

1. Define a natural region and give an illustration with a description of an area that may be so described. (C. U. Inter., '23).
2. What do you mean by a 'natural region'? Into how many natural regions can the world be divided? Name them and indicate their position in a map. (I. P. S., '31, '32)
3. Describe the climatic regions with special reference to the animal and plant life to be found in each of them. (C. U. Inter., '24).

4 What do you mean by a Mediterranean type of Climate, and in what parts of the world other than the Mediterranean region this climate is found? (U.P '31, C U B Com, '25, Inter., '27, '41, '43, '46)

5 Account for the Mediterranean type of Climate, and compare it with the monsoonal type. Also give the chief products in each of them (C U Inter, '25, '30, '33, '35, '40, B. Com, '29, '33)

6 What are the chief conditions which determine the position of deserts both cold and hot? Do you know any desert of commercial value? (C U. Inter, '27).

7 Explain the following phenomena

(i) In the Mediterranean region most of the rain falls in winter months

(ii) Civilised man is found mostly in the lowland regions of the Temperate Zone (I P. S, '32).

8 Give a general description of the climatic conditions and their relation to the economic development in those areas of the world characterised by the west marginal type of climate. (U.P. '34)

9 Give an account of the conditions of climate and vegetations in areas having the St Lawrence type of climate. Show the influence of these on human development (U P. '41).

10 What do you understand by the Monsoonal type of climate? Describe its characteristic products (C. U Inter, '44).

CHAPTER IV

COMMODITIES OF VEGETABLE AND ANIMAL ORIGIN

Agriculture including stock-raising is the most important primary occupation of man. Cultivators of the land and breeders of stock use the reproductive powers of plants and animals to increase their stock and produce. The distribution of agricultural products over the surface of the earth is mainly determined by the nature of the climate (pp. 11, 12) and character of the soil. The climatic factors specially humidity and temperature are the most important but the importance of soil cannot be overlooked.

Soil is chiefly ground-up rock containing sometimes Classification as much as 95 per. cent., minerals besides some organic matter derived from the decay of plant and animal life. There are no soils that do not contain some plant food. Absolute infertility in a soil is rare. Like climate soil may also be classified into a number of types. Soils differ from one another in two particulars—*mechanical or physical properties* and *chemical constituents*. Physically they differ in *texture* or the condition of their particles. On the basis of *texture* they may be classified as sands, silts and clay. *Sandy soil* contains more than 60 per cent. of sand and 10 per cent. of clay. They are easily worked but water drains away quickly. *Clayey soils* contain a high proportion of clay. They are sticky when wet and hard when dry and so difficult to work. *Silt Loam soils* contain much clay, less silt and yet less sand.

Soil structure.

But it is inadequate to classify soils only on the basis of texture, which is purely a mechanical or physical property. Soils differ from one another as much in *structure* as in texture, and what is perhaps more important, structure is essentially due to the presence of certain chemical substances like calcium, magnesium, potassium etc., as well as of organic matter, or, as it is often called, humus, which is the product of vegetable and animal decay. Soils closely similar in texture are often found scattered over regions widely different in general climatic conditions; but this is scarcely the case so far as structure is concerned, because structure, being a reflection mainly of the chemical and organic constituents of the soil, must differ from one climatic region to another. Alluvial lands, especially large deltas, are commonly remarkable for their fertility because, in addition to the fine texture of the soil, they contain chemical substances, as well as organic matter, derived from the whole basin of the rivers forming them. The almost inexhaustible fertility of the Ganges delta is an outstanding example. So also are the beds of dried up lakes. The areas of heavy rainfall all the year round are generally much less fertile than we would normally expect them to be, because the rains carry away either into the subsoil or away in the drainage waters huge quantities of mineral plant foods from the soil, and combined with uniformly high temperature the abundant precipitation results in a most rapid chemical weathering of the rocks. The comparative infertility of the Equatorial Regions is a case in point.

Soils also differ in colour, and colour as a fairly faithful reflection of the inner chemical and organic composition of the soil is an important characteristic and index. A red colour ordinarily indicates the presence of iron oxide, a reddish-brown colour that of iron oxide and organic matter.

a light colour is an index of a lack of important ingredients, whereas a black soil is almost always found to be extremely rich in plant foods and humus.

Soils may also be very broadly classified as (a) *lime-accumulating* and (b) *non-lime-accumulating* soils. The lime-accumulating soils are, on the whole, alkaline, and suitable to crops. It is said that the presence of lime usually "indicates an abundance of some or all of the essential mineral fertilizers." Non-lime-accumulating soils cause the formation of acid humus which are generally destructive to crops. There are acid tolerant plants, however; but they are mostly useless for man and his domestic animals, and the weeds that thrive under acid conditions are often a serious menace to agriculture and transport.

Soil Conservation and Soil Treatment.—Soil erosion is caused by various factors, the most important of which is running water. No sooner rocks decompose rain water begins to wash away the particles along the slopes towards the oceans. Soil erosion, we are told, has assumed alarming proportions in the U.S.A., whence nearly 513 million tons of silt and 270 million tons of dissolved matter are annually carried to the sea by the rivers of that country. It has been estimated that this is a loss of mineral plant food approximately twenty-one times as great as that caused by plants by way of the absorption of food. Soil thus removed is said to have totalled that of an area of 13 million acres, nearly double the area of Belgium.¹ Such may well be the history of soil erosion in all lands. But the rate of erosion is by no means even approximately the same everywhere. Even in North America it is widely different. Thus it was once shown by actual measurement that 7 inches of the surface soil was removed from a Missouri farm land in

¹ Case & Bergsmark, *College Geography*, p. 85.

Prevention
of erosion.

24 hours, whereas in bluegrass sod the same type of soil is carried away at the rate of only 7 inches in 3,547 years.² Methods of preventing soil erosion must be based on the principle that if all the rain water be completely soaked into the ground where it falls, soil erosion would be reduced to a minimum. Hence methods are to be devised for the storage of as much rain water as possible, as well as to reduce its velocity in order to reduce its power of transportation. But soil cannot be made to store up water indefinitely, because that capacity depends upon its porosity. Hence methods are to be employed for increasing the porosity of the soil. How can this be done? It can be achieved by deep plowing, thorough incorporation of organic substances in the soil, seeding land to pasture, growing timber, planting cover crops, contour plowing, hillside ditching, and terracing.

Waning of
fertility.

It has been aptly said that, though the soil may be made to yield indefinitely, it is by no means indestructible. In China thousands upon thousands of acres of land have been cultivated for more than forty centuries, and yet the soil remains fertile. In the Nile Valley they have been raising crops for fifty centuries, and the soil does not yet show any sign of exhaustion because of its yearly rejuvenation by the sediments borne thither by flood waters. On the contrary, the valleys of the Tigris and the Euphrates, once the granaries of the Middle East, are now barren land. Enormous tracts in India, southern Europe, southern U.S.A., are now lying waste, thoroughly depleted. The fact is that however rich a particular type of soil may be, its fertility will be on the wane, sooner or later, as a result of cultivation, unless, of course, adequate steps are taken for its rejuvenation, because plants by subsisting on the soil take away its food materials. To offset this, two methods

Rejuvena-
tion of soil

² *Ibid.*

are generally employed. One is to vary the crops on the same plot of land. Since different plants live on different food materials or at any rate on the same materials in different proportions, this varying of crops prolongs the youth of the soil by drawing out its substances slowly one by one, and yet the cultivator is not obliged to sit idle all the while. Moreover, when a particular type of crop is drawing away a particular type of substance the soil finds some time to replenish other types of materials by the natural processes of soil formation. Further, it is not necessary always to root out a plant entirely from the land, and so the residual parts of the plants help to restore to the soil much plant food. But this method of varying the crops does not always give the expected results as it is, in essence, a method only of prolonging the youth of the soil by drawing away from it as little material as possible; it acts, on the whole, in a negative way. Hence the necessity for adopting a positive method which would replenish the lost materials. This can only be done by fertilizers. And what might seem rather strange is the fact that the quantity of materials restored to the soil by fertilizers need not be equal to that withdrawn by the plants; it may be considerably less, and yet the best results are obtained. Strange as it may seem, this is due to the fact that the food absorbed and hence taken away by the plant does not come entirely from the soil, but much of it is derived from air and water as well. A plant containing, say, one ounce of nitrogen might have derived only a fraction of it from the soil, and when fertilizing we are to replenish the soil with only that part of the material which the plant has taken away from it, or even a lesser quantity may be replenished, because the soil also is perpetually replenishing its lost properties by natural means. And just as by the

Irrigation.

use of manure we replenish the deficiencies of the soil, so by means of irrigation we can remedy the deficiencies of rainfall. But, again, irrigation has its limits, too; and in many arid or semi-arid lands 'dry farming' is practised. This consists in various ingenious means devised for conserving the moisture contained in the soil. Often stones are spread thickly over the surface in order to prevent evaporation from the soil by the direct rays of the sun.

Dry Farming.

Agricultural Products

(1) **Cereals**—These are cultivated grass whose seeds may be taken cooked or ground into flour or meal. *Wheat* and *Rice* are the two most important food-grains of the world. Other grains are *Oats*, *Barley*, *Rye*, *Maize* and *Millets*.

(2) **Fruits**—*Banana*, *Pine Apples*, *Sugar Cane* and *Mango* are products of the Hot belt. *Citrus fruits*, *Figs*, *Grapes*, *Peaches* and *Apricots* are Mediterranean fruits. *Apples*, *Plums*, and *Berries* grow in cool temperate regions.

(3) **Root-crops**—*Sugar-beet* and *Potatoes*

(4) **Fibres**—*Cotton*, *Flax*, *Jute* and *Hemp*. *Wool* and *Silk* are animal products.

(5) *Tobacco*, *Coffee*, *Cocoa*, *Tea* and other *Beverages* and *Drugs*.

(6) **Oil Seeds and Vegetable oils**.

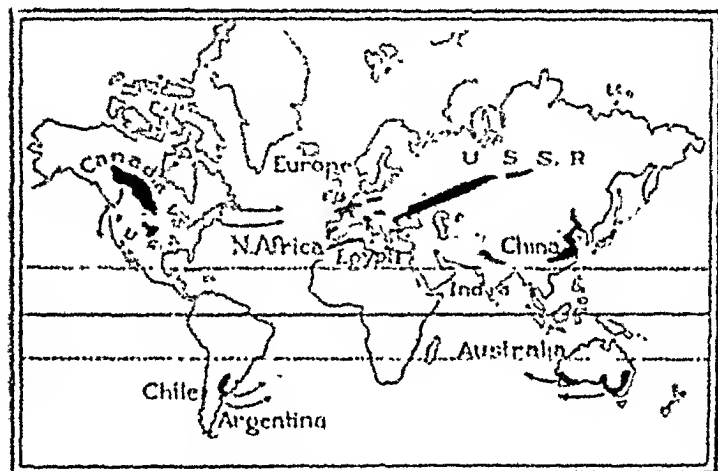
I. Cereals

Varieties.

Wheat.—Wheat like barley, oat, and rye is believed to be essentially a crop of the Cool Temperate lands.¹ Some two decades ago there was discovered in Palestine a wild wheat which, according to the botanists, is the ancestor of

¹ Stamp, *A Commercial Geography*, p. 43.

the present-day cultivated varieties. The range of wheat is great; it is cultivated from Alaska and Siberia to the Argentine Republic, and from sea level to altitudes of several thousand feet in the tropical areas¹. Consequently it has developed such a large number of varieties as are very nearly countless, and most of these varieties are so well acclimatized to local conditions that they would not flourish



WHEAT LANDS OF THE WORLD

except in particular regions. Indian wheat does not thrive on English soil, nor does English wheat in an Indian habitat. There has of late been developed a few varieties of wheat which ripen in the short summer of Alaska, north-west Canada and Siberia. And all these varieties differ in the composition of the grain as well, having been developed under different climatic conditions.

The climate for the production of wheat must, of course, be temperate, and the weather, during the seeding and ger- of growth. Conditions

¹ J. F. Chamberlain, *Geography*, p. 190

Two groups
of wheat-
producing
countries.

Wheat-growing countries of the world may be roughly classified into two groups,—those cultivating the crop mainly for home consumption, and those from which large quantities are annually exported. Although Europe, even when Russia is excluded, is still the greatest wheat-producing continent, most of her countries belong to the first group; not to speak of export, these countries are to make up the deficiency by imports. Of these only Russia is a notable exception. Countries and states like the U S A , Canada, Argentine, Austraha etc. export large quantities of wheat every year, and hence belong to the second group. But there are countries, again, which formerly used to export wheat, but now require most of their produce for home consumption. India is the outstanding example among such countries, Russia is another example, and the U S.A., of late, has been coming into the line. But why does Europe, albeit her large production, import wheat? This is simply because her entire production, more than a third of the world's total, is not sufficient to meet her needs; Europe consumes over half the world's total.¹

Why
Europe
imports
wheat?

A com-
parison of
yields of
different
countries.

Of all the European countries, excluding Russia, France is the largest, and correspondingly has a larger acreage under wheat than any other of these countries or states. But the yield per acre² is only moderate, being only 24 bushels an acre. The Mediterranean lands have a still lower yield, the average in Italy is 21 bushels per acre. in Spain it is as low as about 13 bushels. The countries of North-Western Europe, however, rank very high in this respect; the average for the United Kingdom has been estimated at 33.5 bushels, for Belgium 40, for Denmark

Europe.

¹ Stamp, *A Commercial Geography*, p. 47

² Figures relating to the yield per acre of different countries have been obtained from *The International Year Book of Agricultural Statistics* quoted in *Chisholm's Handbook*, p. 121.

43, and it is as much as 45 bushels per acre in Holland. Germany gets a return of 32 bushels for every acre of land. It is, again, 21 in Hungary, 17 in Bulgaria, 13 in Rumania; and although Russia is one of the largest producers of this cereal, if not actually the largest, her out-turn per acre comes as low as 11 bushels on the average. The wheat belt of Russia almost completely overlaps with the famous chernozem or black earth which runs right across the south from the borders of Rumania into southern Siberia so as to touch the Chinese borders on the east. The severity of winter obliges the Russian peasant to cultivate spring wheat over most of the region; all through the rest of Europe the cultivation of winter wheat is the general rule. North America is another important continent for the production of wheat, and the Canadian prairies together with the adjacent areas of the United States form an enormous wheat belt. But the cereal is also cultivated in the comparatively fertile areas of the plateaus within the Rocky Mountain folds. There are thus quite extensive wheat lands in the north-western states. And as in the Mediterranean lands of Europe so also in the Mediterranean land of California this cereal is grown. And yet the average yield per acre in North America is not impressive, being 19 bushels in Canada and only 15 in the United States. Canada is now the world's largest exporter of wheat. As in Siberia so in Canada most of it is spring wheat. In South America the wheat-growing centres are the Argentine, Uruguay and Central Chile. Of these the Argentine now occupies the second place among the wheat exporters of the world. In Asia the important wheat-growing countries are India, China, Japan and Manchuria. In China very little wheat is grown in the south, but in the central and northern parts of that great sub-continent, and particularly in the latter, it is the dominant crop. It has

North
AmericaSouth
America.

Asia.

been rather vaguely estimated that a total of about 37 million acres in China is under wheat, and the annual production may be something like 15 million tons.¹ The yield per acre is, therefore, not impressive, although the quantity is quite large. So far as the amount of absolute output is concerned, China and U.S.A., rank second in the world, as the figures for 1935 show, the first place, according to the same figures, is occupied by the U.S.S.R. China does not export wheat. Japan also grows a fairly large amount of wheat, over one million acres being under it; but it is there only a secondary crop used entirely for home consumption. The average yield per acre is fairly good—28 bushels. Manchuria, especially the northern part of it, is said to be an ideal wheat country; but at present about $7\frac{1}{4}$ million acres, or a little more, are under this cereal, and it is still of lesser importance, although some amount of it is annually exported. The most important wheat fields of India lie in the United Provinces, the Punjab and the North-Western Frontier Province, but there are wheat fields of some importance on the plateau of Peninsular India as far south as the Dharwar district of the Bombay Presidency. Some amount of wheat is also grown in northern Bihar, particularly in the north-western tracts of the province; but it disappears gradually down the Ganges Valley with increasing heat, moisture and rainfall, although not entirely before entering the middle-west parts of Bengal. The Punjab, however, is the chief wheat-producing region of India. Nearly 30 million acres in India under this crop; but the average yield per acre is very low—only 10 bushels per acre annually. Figures for 1935, however, show that from the point of view of absolute production India ranks fourth in the world. India used to export wheat formerly, but now the surplus is too small to be expected, and in some

¹ Stamp, *Asia*, p. 491

years she even imports some wheat. The wheat fields of Africa are small, and confined almost entirely to the Mediterranean regions like Morocco, Algeria, Tunis and above all, Egypt. The Cape Town region on the south-western coastal fringe of Africa has also a Mediterranean type of climate and produces small quantities of wheat. There are two wheat belts in Australia,—the one in the south-east where there is rainfall all the year round, the other in the south-west where a Mediterranean type of climate prevails. Of these the former is by far the more important belt, and though there is rain at all seasons the amount of precipitation is not heavy, varying as it does from 10" to 40" annually, and the production of wheat is concentrated more especially in the areas where rainfall ranges from 20" to 30". The Mediterranean region which receives its heavenly moisture during the winter has an average rainfall of 20" to 40".

Wheat is of course a natural food crop, and ranks the highest amongst the food grains in respect of the total acreage under it. From the point of view of world production, however, it can be bracketted with maize and rice. But it is by far the most important of the food grains from the point of view of international trade.¹

Position of
wheat as
regards
production
and trade.

¹The Relative Importance of Chief Food Grains

Crop	Acreage in millions of acres	Annual production in millions of metric tons	Percentage of total export
Wheat	330	125	20
Maize	200	125	6
Rice	200	125	4
Oats	150	75	2
Rye	120	35	3
Barley	100	40	7

This table has been taken from Stamp, *A Commercial Geography*. It may be noted here that the figures are only approximate, and that "grains form an important part of the diet of over 99 per cent. of mankind"

Prepara-
tions of
wheat

The chief use of wheat is of course for food; by far the greatest portion of the world's total output is milled into flour, and, as already mentioned, different varieties are often blended for obtaining the best flour. Of the various sorts of food prepared from wheat may be named, besides loaves and bread, the Italian delicacies called macaroni and vermicelli. Large quantities of starch are also obtained from wheat, while the straw is extensively used for fodder, for stable mattresses, straw boards and the cheaper grades of wrapping paper.

World trade
in wheat.

The quantity of wheat entering into the world trade was, it has been estimated, something like 17.4 millions of tons on the average annually during 1909-13; during 1921-25 it was about 17 millions, and in 1931-33 something like 17.7 million tons. Since the trade is on the increase the total at present is about 20 million tons a year, and with this we are to add another 4 million tons of flour. The chief exporters, as it can be seen, are Canada, Argentina, the U.S.A., and Australia. The chief importers are the United Kingdom, Italy, Germany, France, Belgium, Holland and Switzerland,—and also both Japan and Brazil.

The Export of Wheat¹

1909-13		1921-25		1931-33	
Countries & States	Percentage	Countries & States	Percentage	Countries & States	Percentage
Russia	24.5	Canada	35	Canada	31
Argentina	14	U S A	25	Argentina	20
Canada	11.5	Argentina	20	Australia	19
Netherlands	8.5	Australia	12	U S A	7
U S A	8.25	India	3	U S S R	7
Rumania	7.5	Others	5	Rumania	2
India	7.25			Hungary	2
Australia	6.75			Germany	2
Others	11.75			Others	10
Total	100	Total	100	Total	100

¹ The table which has been adapted from Stamp, who uses diagrams instead of a table, is only approximate

The Import of Wheat¹

1909-13		1921-25		1931-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
Gr. Britain	.. 32	Gr. Britain	31	Gr. Britain	.. 32
Germany	.. 14	Italy	.. 16	France	.. 16
Belgium	.. 12	France	.. 8	Belgium	.. 7
Netherlands	.. 11	Germany	.. 8	Italy	.. 6
Italy	.. 9	Belgium	.. 7	China	.. 6
France	.. 6	U. S. A.	.. 5.75	Germany	.. 5
Switzerland	.. 3	Netherlands	3	Brazil	.. 4.5
Brazil	.. 2	Switzerland	3	Netherlands	.. 4
Others	.. 11	Japan	.. 2.5	Japan	.. 4
		Brazil	.. 2.75	Greece	.. 3.5
		Others	.. 15	Switzerland	.. 3
				Others	.. 15
Total	.. 100	Total	.. 100	Total	.. 100

Europe, though still the greatest producer of wheat, has been steadily growing more and more dependent on foreign supplies of this commodity; this is mainly due to her industrialization. The chief wheat-importing countries are those of the west of Europe, where manufacturing industries have largely supplanted agriculture. There are only six countries in Europe, showing an excess of exports over imports, and they are Russia, Rumania, Hungary, Yugoslavia, Bulgaria and Poland. Formerly France and Spain also exported some amount of wheat, especially in the years of plenty; now both of these are wheat-importing countries. England in the eighteenth century was not only self-supporting in respect of this commodity, but could even sometimes afford to export more than a quarter of a million bushels of wheat. But with the development of her cotton manufacture the scale began to be turned till at last she came to be wholly dependent on foreign supplies. She is now the largest importer of wheat in the world.

Industrialization of W. Europe and wheat import

Self-supporting countries of Europe.

Present position of France, Spain, and B. Isles

¹ Adapted from Stamp's *A Commercial Geography*.

Conditions
of growth

Barley—Barley is now the most widely distributed cereal, and many writers are of opinion that it is the oldest of the cultivated grains¹ It matures in Norway as far north of the Arctic Circles as 70°N, and in Liberia within 10° of the Equator.² Any soil or any climate that is good enough for wheat is also good for barley, and it is in such climate and soil that the best barley is grown. But its range is wider than that of any other cereal. It can also mature very quickly, and thus flourish in the short northern summers or in "the brief warm spells of high mountain valleys" It also flourishes in most of the Mediterranean lands. But it is decidedly less tolerant of moisture than wheat, and does not, therefore, grow in the moist parts of cool temperate lands like Britain On the whole, the wheat-growing regions and the barley-growing regions coalesce rather intimately, especially in the southern countries of Europe as well as in lands surrounding the Mediterranean, which are too dry in summer for maize; but barley is commonly restricted to the drier and colder and hotter parts, as well as to a poorer soil In the northern countries of Europe the barley-growing regions coalesce with those of oats, because these lands are generally too cold for wheat Europe is the largest producer of barley, growing about half the world's total,³ and Russia is by far the most important barley-producing country in Europe, with nearly one-third of the world's total produce. The U. S. A., China, Germany, Japan, Canada, Spain, India, North Africa, Rumania, Poland, Czechoslovakia are the other important producing countries. The whole of the Southern Hemisphere produces only about 2 per cent of the world's total.

¹ *Op Cit.*, p 130

² J. F. Chamberlain, *Geography*, p. 199.

³ Stamp, *A Commercial Geography*, p 51

Generally speaking, the yield per acre of barley is larger than that of wheat.

Production.

Production of Barley

Average per year in Millions of Metric Tons.

	1925-29		1932-36
U. S. A.	.. 5.8	China	.. 7.0
U. S. S. R.	.. 5.7	U. S. S. R.	.. 7.2
Germany	.. 3.2	U. S. A.	.. 4.3
Japan	.. 2.6	Germany	.. 3.3
India	.. 2.4	Japan	.. 2.6
Canada	.. 2.3	India	.. 2.5
Spain	.. 2.0	Spain	.. 2.5
N. Africa	.. 1.8	Canada	.. 1.8

The chief use of barley, like that of wheat, is for food. Barley-bread is an important article of food in Japan, Scandinavia, India and North Africa. But the bread is rather heavy, and with the rapid extension of commerce barley has come largely to be replaced by wheat. It now forms part of the ration for horses, cattle and pigs in many countries. One of its chief uses for man now is in the form of drink, not food, since it is extensively used in the preparation of alcoholic drinks like beer and whisky. Large quantities of starch and malt are obtained from the grain.

Preparation of Barley.

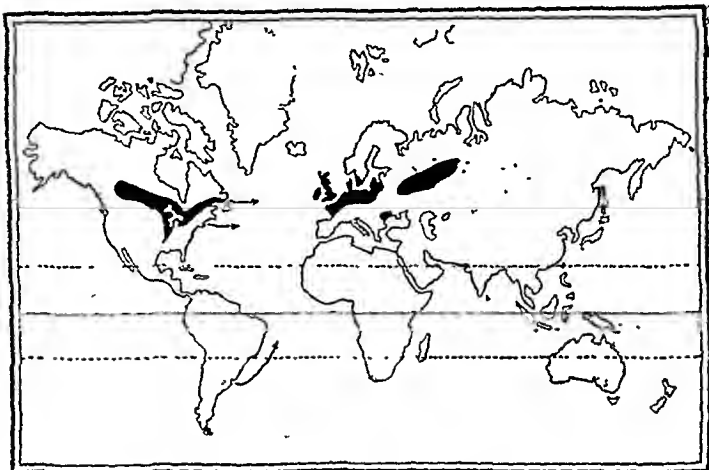
The chief exporters of Barley are Rumania, the U. S. S. R., the U. S. A., Canada, Poland, Argentina, India, Australia, etc. The importers, it is interesting to learn, are the great beer-drinking countries of Europe. The principal importers are the United Kingdom, Germany, Belgium, Holland and other countries of West Europe.

World Trade in Barley.

Oats.—The conditions best suited for the production of this crop are basically the same as those for the cultivation of wheat and barley; but oats require, on the whole, a more moist and cool climate. It has a wider latitudinal range than wheat, and thrives well on a greater

Conditions of growth

variety of soils¹ Oats have a wider range than both wheat and barley, because they grow in regions which may be a trifle too dry for wheat, but not at all so for barley, as well as in regions which are too wet for both. Moreover, oats thrive well in areas too cool for wheat, but not at all



THE OATLANDS OF THE WORLD

too cool for barley. But wheat and barley easily flourish in climes too hot for oats. Thus it happens that in the northern countries of Europe oats are the associates of barley, not of wheat; but in the southern countries of Europe, which are too hot for oats, barley and wheat go together, the former generally penetrating farther south just as it pushes beyond the oats belts in the cold north; whereas in the wetter parts of the Temperate Zone oats only predominate. Thus in the western parts of the British Isles, which are damper, oats grow in abundance, but not a stalk of barley is to be seen.

¹ Chisholm's *Handbook*, p. 129.

The great oat-producing countries of the world are the U.S.A., Russia, Germany, Canada, France, Poland, Hungary and the United Kingdom. Europe, excluding Russia, produces about 40 per cent. of the world's total production. It is a very important crop in Ireland and Scotland, and if we take the British Isles as a whole we find that it is the leading cereal there. Large quantities of it are also grown in Denmark, Holland, Belgium and the lands surrounding the Baltic Sea. Besides the United States, Canada is an important producer of oats. The Argentine and Chile, however, are practically the only oat-producing countries south of the Equator.

Production of Oats

Average per year in Millions of Metric Tons.

1925-29			1932-35		
U. S. A.	..	10.1	U. S. S. R.	..	16.4
U. S. S. R.	..	14.2	U. S. A.	..	13.1
Germany	..	6.5	Germany	..	6.0
Canada	..	6.1	Canada	..	5.2
France	..	5.1	France	..	4.8
U. K.	..	2.5	Poland	..	2.4
Poland	..	2.3	U. K.	..	2.3

Oats usually are used as food for horses and cattle, and that is one of the reasons why it is imported in large quantities into countries engaged in the dairying industry. But it is also—though rarely—used for human consumption. Oatcakes, oatmeal porridge and some other like delicacies are well appreciated in Scotland and some of the Scandinavian countries. In the former place these delicacies formed the staple food of the people as late as the end of the eighteenth century.

The quantity of oats entering into world trade is, however, meagre; only about 4 per cent of the total production comes to the international market. This is because, with

Uses of
Oats

World
trade in
oats.

the exception of one or two countries like the Argentine and Chile, for example, most of the countries produce it for home consumption. - Argentine, Canada, U.S.A., Rumania etc., are the leading exporters. The chief importer is Great Britain; of the other countries importing oats Switzerland, Belgium, Holland, Austria and Denmark are important,—countries engaged extensively in dairy farming.

Conditions
of growth

Rye.—Rye has been well described as a “poor relation” of wheat;¹ it grows, therefore, under conditions similar to the growth of the latter crop. But it is a hardier plant than its ‘aristocratic relation’, and has no such exclusive choice of soil; it will flourish at a lower temperature and in much poorer soils, and is, therefore, cultivated in both high latitudes and high altitudes. In Russia a large quantity of rye is grown far to the north of the celebrated ‘Black Earth’ Zone, and in Norway, because of the moderating influence of the warm ocean current, it is cultivated as far north as the Arctic Circle.² It is grown extensively on the marshy and sandy tracts of the Great European Plain, as well as on the Central Plateau of France and the North-Western highlands of Spain.

Production

Europe is the leading producer of rye, and of all countries Russia ranks the highest in this respect. The bulk of the world’s rye—nearly 95 per cent—is grown on the mainland of Europe and Asiatic Russia. The highest concentrations are found in the areas lying east of the Rhine and north of the Alpine ranges; almost a continuous stretch of rye fields extends from Northern Belgium across Germany into Poland, flanked on the north by the lesser fields of Holland, Denmark, Southern Sweden, East Prussia, Lithuania, Latvia, Esthonia and Southern Finland, and on the

¹ Stamp, *A Commercial Geography*, p. 54

² J. F. Chamberlain, *Geography*, p. 197.

south by those of South Germany, Austria, Czechoslovakia, Hungary and Southern Poland. Towards Eastern Poland the fields grow somewhat less concentrated till they reach the western borders of the U.S.S.R.; here again we notice another enormous belt of rye, far surpassing the other, lying in a general north-easterly direction, flanked on all sides by innumerable fields of lesser concentration. Russia produces more than 50 per cent of the world's total; Germany ranks second among the rye-producing countries, and Poland probably comes third. Other important producers are the U.S.A., Canada and Japan. The total production of rye has been estimated at 1.8 billion bushels a year on the average as against about 4 million bushels of wheat.¹ Rye is said to be 'the least familiar of all the grain crops grown in the British Isles.'²

Rye has also been described as 'the grain of poverty', *Urea of rye.* and the appellation is not without signification.³ It is the staple food of the peasant population of nearly half of Europe; but the bread is somewhat heavy and sour, and is quite dark in colour. With the rapid growth of world commerce and the slow but unmistakable pace towards the amelioration of the economic conditions of the poorer classes, wheat is gradually becoming available to industrial workers, though not to peasants. Hence the production of rye has not been showing any signs of increase in recent years: it has remained stationary for a long period. Rye is not at all popular in the United Kingdom and the United States. Its cultivation in the U.S.A., and Canada has been ascribed chiefly to the immigration of peasants from the great rye-producing countries of Europe, as well as to the demand of rye whisky. Of the several alcoholic drinks prepared

¹ Case & Bergsmark, *College Geography*, p. 421.

² Chisholm's *Handbook of Commercial Geography*, p. 131.

³ Case & Bergsmark, *College Geography*, p. 422.

from rye, vodka so popular in Russia, and rye whisky are important. The straw of rye is long and tough, and is used in making straw hats, mats, ropes and certain kinds of cheap paper and pasteboard. In some parts of Europe houses are said to be thatched with this straw.

World
Trade.

Rye is grown almost entirely for home consumption. So the international trade in this commodity is quite meagre. The small amount of trade is between the U.S.A., and Canada on the one hand and the rye-consuming countries of Europe on the other. The Argentine has of late been exporting some rye to Europe. But the U.S.A., is now the chief exporter.

Rice.—Rice is essentially a tropical and sub-tropical food grain, suited more to the Tropical Monsoon Lands than to any other part of the Torrid Zone. It is in all probability a native of India; for it is the only cereal which still grows wild in this country.¹ Many are of opinion that it was first introduced into China as early as 3000 years before the beginning of the Christian era.² It was first taken to America in 1694. There are numerous varieties of rice, and the total number probably exceeds that of the varieties of wheat.³ And many of these exhibit quite strong local preferences. Very broadly we may reduce these innumerable varieties into two,—(a) *Lowland* or *Swamp Rice*, and (b) *Upland* or *Hill Rice*. Upland rice is grown generally on hill slopes, but the other variety is by far the more important. Lowland or Swamp rice is grown on flat plains capable of being readily flooded when necessary. It is interesting to learn that rice fields must have an impervious layer comparatively near the surface; otherwise the life-

Varieties &
conditions of
growth.

¹ Case & Bergsmark, *College Geography*, p. 214.

² J. F. Chamberlain, *Geography*, p. 199.

³ Stamp, *A Commercial Geography*, p. 55.

giving waters would percolate farther below than the reach of the plant roots. Rice can be grown on a variety of soils, but a free loam affording good conditions for root-development with a heavy clay sub-soil capable of retaining water is best suited for it. Hill rice naturally thrives on a drier soil, and in India it is grown even at an altitude of 8,000 feet;¹ but it is comparatively unimportant. For the cultivation of lowland rice the fields are first roughly ploughed under water, which is prevented from draining away by means of carefully raised embankments on all sides of the field, and the seeds are sown as in nurseries. Then the tiny plants begin to grow under the water till they shoot out their fine stalks about six inches above the water level, when the cultivator transplants them by hand in several rows in the flooded fields. As the plants begin to grow the water is allowed to drain away gradually, and by the time the paddy ripens the fields are dry. For the ripening of paddy a temperature between 75° F., and 80° F., is needed. Rainfall must be abundant during the sowing season as well as in the earlier part of the growing period. But excessive showers during the ripening season is extremely injurious, sometimes even causing a total failure of the crop. That is why rice is best grown in the Tropical Monsoon lands. Where the annual rainfall is below 45" it is seldom raised. If the temperature be uniformly 80° F., or a little higher during the ripening period, the grain matures with almost incredible rapidity and under like conditions as many as five crops a year have actually been harvested.² Usually, however, two crops are obtained annually. In more temperate regions rice is a summer crop, wheat or another temperate cereal being the winter crop. It has an average growing period of 135 days

Cultivation.

¹ Chisholm's *Handbook of Commercial Geography*, p. 191

² Stamp, *A Commercial Geography*, p. 56.

Other
countries.

Ceylon, Malaya, and the East Indies do not grow as much rice as is needed for home consumption. In Europe, rice is somewhat important only in Italy and Spain. In Africa Egypt is an important producer, with Sierra Leon a close second. In North America fairly large quantities of rice are grown on the coastal region of the Gulf States near the Mississippi delta and in the Sacramento valley of California. It has also been introduced in British Guiana. The coastal regions of Brazil and Guiana in South America are fairly important in this respect.

Preparation
and Use
of rice.

As is quite well-known, the first operation after harvesting is the threshing of the paddy, which is then put through the hulling machine. The grain is next screened and the kernels polished. Rice is thus given a white look and rice flour is obtained through this operation of polishing. The straw is used in making mats, ropes, bags, hats, raincoats, sandals, and even houses are sometimes thatched with it. The husk is used for filling mattresses and in packing goods. A number of distilled liqueur and other intoxicating drinks are made from the germinated grain. Rice being richer in carbohydrates than wheat, considerable amount of starch is also made from it. Rice is the staple food of nearly one-third of the world's population. The whole of the enormous quantities grown in India and China is consumed at home. So it is in Japan, which, in addition, imports large quantities from other places in order to meet her internal needs. Rice is also the staple food in Burma, Siam and French Indo-China; but these countries, thinly peopled that they are, produce a larger quantity than is needed for home consumption, and can, therefore, spare a good deal to carry on an export trade. Ceylon, Malaya and the East Indies, on the other hand, cannot produce enough to meet the internal demand, and are, therefore, obliged, like Japan, to import

some amount of rice. In Europe and America highly polished rice and rice milk-puddings occasionally enter into the menu of the well-to-do people more as delicacies than as food.

Since most of this crop is produced for home consumption, the amount entering into world trade is but small,—only just over 6 million tons a year. The principal part of the trade—from about a half to two-third—is between the Asiatic countries, and the remainder between the rice-exporting countries of Asia, and rice-importing countries of Europe. Indeed as pointed out by Stamp, the world trade in rice is of two types. The first type consists in exporting the surplus rice from one rice-eating country of the Orient to another for the purpose of making up the deficiencies of the latter. This trade, as is quite inevitable, varies from year to year as the harvests in these countries fluctuate. If there is a marked scarcity in China in any year the bulk of the surplus will go to that country; next year Ceylon or India may import a greater amount than previously, and so on. The second type consists in exporting rice from the Orient to Europe and other countries. This aspect of the trade remains fairly constant, although it too fluctuates markedly if there is a famine in any of the larger rice-eating countries. The U.S. A., grows about half the quantity required for home use, and imports the remainder from the Far East. Yet it is said that “there is no satisfactory reason why the United States should not grow and mill all of its own rice and become an exporter.”¹

World
Trade in
Rice.

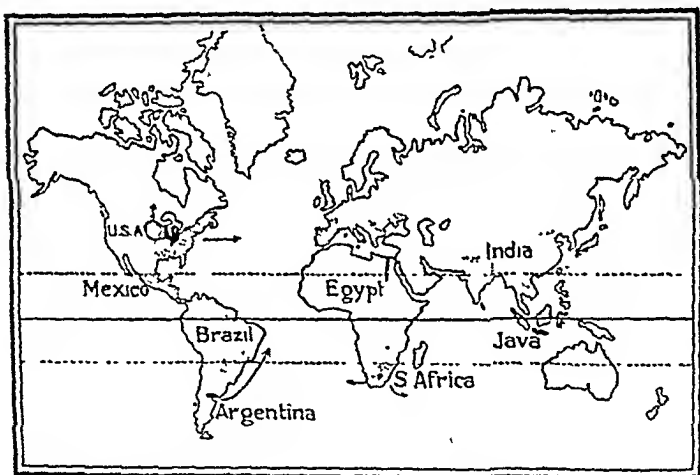
Two types
of trade.

Maize or Corn.—Another name of this crop is Indian Corn, and it is said to be the only cereal brought from the New World to the Old. Columbus was the first to bring it

¹ *Farmers' Bulletin, No. 110, U. S. Department of Agriculture, quoted by J. F. Chamberlain.*

Conditions
of growth.

to Europe² It was probably a native of Mexico or Central America. But in America it is now concentrated in the U.S.A. It is essentially a sub-tropical grain, but may easily be grown in the warmer areas of the Temperate Zone, as well as in the Tropics, but not generally in the Monsoon lands. A fertile, well-watered, loamy soil is essential for its production; during the early part of the growing period it must have frequent and fairly heavy showers, and where rainfall is not abundant water must be supplied by irrigation; but on no account should the ground be drenched



THE MAIZE-PRODUCING COUNTRIES OF THE WORLD.

through and through. Thus it agrees with rice in some respects, and also differs from the latter in others. The average life of the plant is from 135 days to 210 days; and all through this long period there must be plenty of sunshine and an uniformly high temperature with as little variation

² Chamberlain, *Geography*, p. 187. See also Chisholm's p. 127.

as possible. In the middle period of its growth even a moderately marked variation in the diurnal range of temperature causes almost a total failure. Hence it is very nearly impossible to grow maize in such a fickle-weathered country as England.

The bulk of the world's maize—about two-thirds—is *Produktion* grown in the U. S. A., where the crop is almost wholly concentrated in the south and east and the famous Corn Belt, an area twice as large as that under wheat in that country. It is also grown in Mexico in fairly large quantities. But Canada, though she produces a little, is too far north for the Indian corn. In South America, Brazil and the Argentine grows much corn. In Europe it is grown in the warmer and wetter regions like Rumania, Yugoslavia, Hungary and Italy, as well as in the U. S. S. R., south of the great Wheat Belt. Small quantities are grown also in the sunnier and moister parts of France and Spain. In Africa, the Union and Rhodesia are important maize-producing countries. It is said to be the most important of the cereals in that continent, though the total yield is not quite appreciably high. In Asia it is a subsidiary, though not quite an unimportant crop, particularly in India and China. Australia also produces a small quantity.

Maize is a productive crop like rice. The total acreage under it all over the world has been estimated at 200 million acres with a total yield of 125 million metric tons; both figures agree completely with the corresponding figures for rice. Compare the acreage and yield of wheat. In 1909-13 the world's total annual yield of maize was 104 million tons, in 1921-25 it was 106 million tons, and in 1931-33 the figure rose to be 113 million.

Maize has various uses. It is used chiefly as food for animals, particularly for hogs and pigs, and that is the reason

Preparation
and Use
of Maize.

why great numbers of hogs are kept in the famous Corn Belt of the U. S. A., and its absence in the British Isles is one reason why so few hogs are raised there, and most of the pork consumed by the Britishers are imported from elsewhere. But maize forms an important article of human food as well. Though it does not make good bread, the well-known 'mealie pap' or maize gruel is extensively used in South Africa. In England cornflour, which is made by grinding the grains of maize or corn, is fairly extensively used. Corn bread and corn cakes are extensively consumed in America and Southern Europe. The unripe corn is a favourite vegetable in America. Starch, beer, alcohol, and glucose are other important products of maize. Some kinds of cheap paper are manufactured from its leaves; the cobs are made into pipes and the husks are used into mattresses. Another use of the cobs is in the form of fuel. The young juicy stalks as well as the ripened grains are used as food for cattle and stock.

World
Trade.

Though the production is quite large, only a small percentage of the total produce enters into world trade; yet the amount is greater than that of rice coming into the international market; for while only 4 per cent of rice enters into world trade, the corresponding percentage of maize is 6. The United States albeit its enormous production exports a very limited quantity; more than half of the commodity exported comes from the Argentine. Other exporters, besides these two, are South Africa and the countries of South-eastern Europe like Hungary, Rumania, Bulgaria, and the U.S.S.R. The chief importers are the countries of the north-western Europe, because the cool climate of these regions does not allow the cultivation of this crop.

Millet.—Millet is one of the most important of the small grains used as human food. It is characteristic of the drier parts of the Tropics, and has many varieties, some of which flourish in the drier and warmer parts of sub-tropical lands. It grows well in regions having less than 40 inches of rainfall, and even where precipitation is as low as 20 inches it can be grown without irrigation. Conditions of Growth.

Both in India and China it is an important food crop. In India it occupies a fifth of the total cultivated area, and more than a quarter of the area under food-grains. It is the staple food of the people in nearly all the drier regions of this country, and ranks an easy second to rice among Indian crops. There are three main varieties of this crop in India—(a) *cholam* or *jowar*, which in English parlance is called 'Great Millet', (b) *cumbu* or *bajra*, called in English 'Spiked Millet', and (c) *ragi* or *manna*. In China millet is concentrated in the north-east, where the rainfall is usually below 40" a year. Throughout North China it is a close second to wheat. *Sorghum* and *kooliang* are the two chief varieties. Millet is also extensively grown in Manchuria and Japan, and the varieties raised are similar to those of China. In the Uganda region of Africa millet is the most widely cultivated crop, and throughout the continent becomes an easy rival of maize, if it does not actually outweigh the latter in importance as a food grain. The chief variety is the 'Great Millet' known there by the name of *durrah*; often it is also called 'Guinea Corn'. Besides being raised for food, millet is grown also for forage and fuel. A particular type of sorghum is cultivated in the U.S.A., for green fodder. Fairly large acreages in the poorer lands of Europe are also devoted to this crop. Its importance from the point of view of world trade is next to nothing, since almost the entire yield is raised for domestic use. Production and Use.

II. OTHER VEGETABLE FOOD-STUFFS

Three
main
varieties

Sugar.—Sugar is of three main varieties,—(a) *Cane Sugar*, (b) *Beet Sugar*, and (c) *Maple Sugar*. Cane sugar is the product of the juice of the sugar-cane; beet sugar is obtained from the 'roots' of the sugar-beets; and maple sugar is manufactured from the sap of the maple tree.

Production
of Cane
Sugar.

The sugar-cane, originally a native of Eastern Asia,—perhaps of the Ganges Valley and Indo-China—is essentially a tropical or sub-tropical plant. It flourishes in a warm moist climate, and requires a soil rich in phosphates; wholesome sea-breezes are also essential, and that is why all the great cane-growing regions are located near about the sea. But the moisture has its limits, too; an annual rainfall of 40 inches or a little more is ideal for the plant; too much moisture reduces the sugar content in the juice. The leading countries from the point of view of production are India, Cuba and Java; of these India is now the largest producer so far as absolute production is concerned; but she is far behind in relative production, *i.e.*, in regard to the yield per acre or per ton of cane. In this Java easily leads, and Cuba comes second, while India still remains far behind.¹

India,
Cuba &
Java.

America.

In America the important producers are Louisiana in the U. S. A., and the Brazilian and the Peruvian coastal tracts; in the latter area cane-culture is carried on by means of irrigation. There are plantations also in Central America, Argentina, and British Guiana. The smaller islands of the British West Indies are largely dependent on this industry alone. The U. S. A., obtains large supplies from the Hawaiian Islands. In Africa by far the most important cane-growing region is on the east coast of Natal; small

Africa

¹ Stamp, *A Commercial Geography*, p. 62. But see Chisholm's *Handbook of Commercial Geography*, p. 196, where it is definitely stated that "the largest producer is now Cuba"

plantations are found elsewhere, chiefly in the narrow coastal region of Portuguese East Africa, Egypt, and the island of Mauritius. In Australia sugar-cane is grown in Queensland on the north-east coast. The Philippine Islands, China and Formosa are also important producers in Asia. In Europe there are small plantations only in the southern parts of Spain as far north as 37°. In Southern Hemisphere its farthest poleward extent is said to be marked roughly by the 30th parallel.

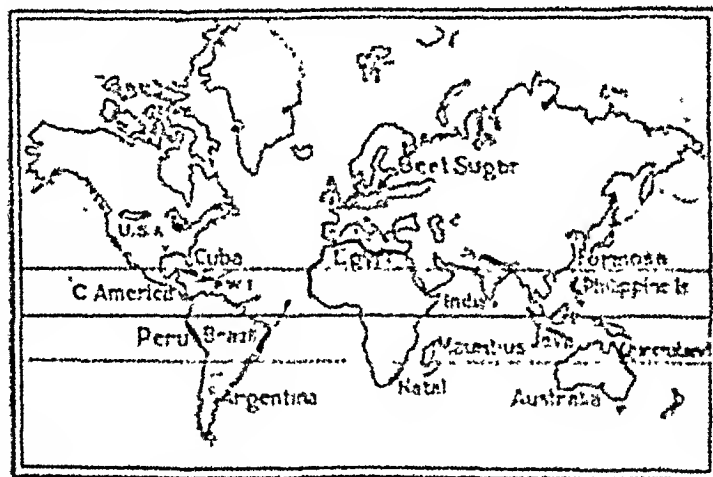
Australia.

Asia.

Europe.

The sugar-cane, like the cereals, is botanically a member of the grass family; but it is a giant member of that genus.

Preparation of Cane Sugar.



SUGAR-PRODUCING COUNTRIES OF THE WORLD.

its stalks sometimes attaining a height of twenty feet. Amongst the better known cereals it resembles the 'Indian Corn' (maize), having joints with a spongy substance between, in which juice is held. But its seed or grain is of little or no value. The stalks of the cane are cut every year on the eve of flowering, but the roots are allowed to

remain, and from these new shoots grow each year for a period of about thirty years or more, although for commercial purposes the plants are usually completely rooted out at the fifth year, and new plants raised. The stalks mature in about ten months, when they are cut by hand and hauled to the mill for squeezing out the juice. The juice is then clarified and sterilized by boiling at a temperature of 130°F. , and by mixing some lime with it. This sterilizing prevents fermentation. Again it is boiled until it reaches the point of crystallizing. Crystalline raw sugar is then made to separate out by being placed in centrifugal separators. Thus is obtained brown sugar which is of a lustrous golden hue and the residual thick syrup goes to form molasses. The crude brown sugar then is transported to the refineries where it is dissolved in hot water and filtered, and the liquid then evaporated in vacuum pans, and the sugar naturally crystallizes. Molasses is consumed by men as well as cattle, and used in preparing certain alcoholic drinks like rum. After the extraction of the juice the canes are used as fuel for the mills. Various types of cardboard are also made of sugar-canes.

World
Trade in
Cane
Sugar.

Although India is now the largest producer¹ of cane sugar she does not export any, but consumes her entire production. She used to import large quantities of sugar from Java till very recently, and ranked third in the world as an importer; now her imports have very nearly ceased.

The chief importers are the United States and the United Kingdom. The U. S. A., besides having a large proportion of home production, obtains her considerable quantities from Cuba, Dominica, Porto Rico and Hawaii

¹ The fact seems to be that till lately—as late as 1936-37—Cuba was the largest producer. The production in India has increased only recently. This is shown by the steady decrease of her imports from Java.

Great Britain imports her sugar mainly from the Empire countries like British Guiana, Mauritius and the British West Indies, as well as from Cuba and Java.

Export of Cane Sugar

1920-23		1921-23		1931-33	
Countries	Percentage	Countries	Percentage	Countries	Percentage
Cuba	33	Cuba	34	Cuba	26
Dutch East Indies (including Java)	24	Dutch East Indies (with Java)	18	Dutch East Indies (with Java)	18
Hawaii	9	Hawaii	5	Hawaii	9
Porto Rico	5	Porto Rico	3	Philippines	8
Mauritius	4	Peru	3	Formosa	8
Philippines	3	Philippines	3	Porto Rico	7
Formosa	3	Formosa	2	San Domingo	4
Peru	2	Mauritius	2	Peru	3
British Guiana	2	Others	20	Mauritius	2
Others	15			Australia	2
				Others	13
Total 100		Total 100		Total 100	

The sugar beet is said to have found its way into Europe from Southern Asia. It is an annual plant belonging to the beet species. The seed is sown in the spring, and the roots of the plant are dug out in the autumn. It requires a lower temperature and less water than does the sugar-cane; but the soil must be well-drained, and a fairly good supply of moisture is essential during the growing period, although too much moisture gives a juice poor in sugar content. A fertile, loamy, lime-accumulating soil is ideal for the cultivation of this plant; it does not thrive on non-lime-accumulating soils. Generally, it likes a long growing period, with the latter part warm and sunny. There must also be freedom from frost from seed time to harvest. The important sugarbeet-producing countries are Germany, Russia, France, Czechoslovakia and Poland in Europe, and the United States

of America. There is, broadly speaking, a continuous sugar beet belt in Central Europe, stretching from France across Belgium, Holland, Germany, Czechoslovakia and Poland to Rumania and the Ukraine in South-Western Russia. The sugar beet area of Spain is also considerable. In the U. S. A., many states, especially those in the north and west, cultivate this plant in large numbers. Fairly large quantities are now being produced in England also.

The 'roots' of the sugar beet mature much earlier—in from four to six months—than the stalks of the sugar-cane. The beets are dug by machinery, and after cutting the leaves in order to leave aside the superfluous mineral matter, they are carried to the factory, where these 'roots' are sliced and soaked in warm water for extracting the juice. The preparation of sugar from the beets then is much the same as that of sugar from the sugar-cane. The pulp is used as a food for stock.

Before the Great War of 1914-18 Germany was the largest producer with about a third of the world's supply. Now the U. S. S. R. is the leading producer of beet sugar with a little less than one-fourth of the world's total. But the trade suffered a setback owing to the World War II, and has not yet recovered. Most of the countries now grow sugar beet mainly for home consumption; world trade in this commodity is, therefore, comparatively much small.

The maple tree is of many varieties, many of which yield a juice from which sugar is manufactured. Of these the sugar maple is the most important. In the eastern parts of Canada, the U. S. A., and the north-eastern states of the Union of South Africa sugar is obtained from these trees. The process is rather simple: the trees are tapped and the juice collected, which then goes through the processes of evaporation and crystallization for the extraction of sugar.

World
Trade in
Beet
Sugar.

Production
of Maple
Sugar.

But the production of maple sugar has steadily decreased owing to various causes; it does not pay enough for encouraging the producer to undertake vast scale production, because of the cheaper price and far greater output of the other two varieties of sugar, and maple sugar is extensively adulterated. Moreover, the number of maple trees both in Canada and the U. S. A. has also steadily decreased owing to extensive cutting for lumber. It is now used almost exclusively as a luxury rather than as food; for its present-day demand is entirely due to its peculiar flavour.¹ It has ceased to have any commercial importance in the international market.

Present position of maple sugar.

Other sources of sugar are the various species of the palm tree, particularly in the tropical countries. The Indian date palm, the Palmyra palm, the cocoanut palm, the toddy palm, and the sago palm are exploited for sugar in India.² Nevertheless the sugar-cane and the sugar beet are now the two most important sources of sugar all over the world.

Other sources of sugar.

Both sugar-cane and sugar-beet have certain characteristic advantages each over the other. Sugar-cane is easy to cultivate; it is grown mainly in the tropical and sub-tropical countries, where labour is very cheap; sugar-cane also is naturally richer in sugar content. Beet, on the other hand, is an exhausting crop, requiring a richer soil and a plentiful supply of potash manures; it must be sown every year and is restricted to regions where labour is by no means so cheap as in the Tropics or thereabouts. But beet has its advantages too: it is grown in areas of dense population, and hence, near local markets, whence the raw materials used in the refineries are easily and relatively cheaply obtained, and where at the same time the finished product

Cane Sugar
vs
Beet Sugar.

Advantages of Cane Sugar.

¹ Chamberlain, *Geography*, pp. 248-251.

² Chisholm's *Handbook*, p. 201.

Advantages
of Beet
Sugar.

Government
help in
production
of Beet
Sugar

can be readily sold without entailing enormous freight charges for transportation. This density of population has other advantages also; a regular and abundant supply of manures can be readily obtained; capital can easily be raised and on a lower rate of interest; machinery can be more cheaply installed and readily repaired or replaced. The methods of selection as employed now-a-days has also successfully combated the natural disadvantage of less sugar content in the beet under the scientific technique of selection, a given weight of sugar-beet has a greater amount of sugar than the same weight of the sugar-cane. Furthermore, the refuse material and by-products of beet are of a much higher value than those of the cane. The beet-pulp is good fodder for animals as well as a useful manure for the soil; whereas the residual matter of the sugar-cane is used mainly for fuel. Yet all these advantages are scarcely enough for successful competition of beet with sugar-cane, and in the opinion of many experts there would hardly be any beet sugar production if it were not for an artificial stimulus in the shape of bounties, protective tariffs and the like¹. Many countries like France and Germany grew wiser after the World War I, and felt that it was dangerous to depend on foreign supply of this indispensable commodity; moreover, the development of the beet sugar industry at home would provide employment for many. So they took to the way of encouraging and protecting their beet sugar industries—to the detriment, of course, of the virtual British monopoly of trade in cane sugar.

Conditions
of Growth

Cocoa.—Cocoa is a product of the cacao tree, which is essentially an equatorial plant of the pod-bearing genus. It is rather a small evergreen tree. The pods vary from six

¹ *Ibid.*

inches to a foot in length, and instead of being attached to the ends of twigs they grow directly from the stem or larger branches. These pods vary in colour from green to a dark purple. The seeds or beans lie embedded in a soft white pulp within the pods in regular rows of often as many as fifty, and are about the size of almonds. Cocoa is obtained from these seeds or beans. The cocoa tree is said to be a native of South America, whence it has been transplanted to other parts of the Equatorial Regions. It requires uniformly high temperature and an abundance of moisture; but, curiously enough, exposure to the direct rays of the sun is harmful to it, especially in the growing period, and hence it is grown in the shade of taller trees. Like direct sunshine, strong winds are also injurious, especially to the pods; hence the Belt of Calms or Doldrums is the ideal situation. Valleys well protected from desiccating winds, and clearings in the dense Equatorial Rain Forests are good situations, since in the latter case the surrounding forest acts as a check to the inblowing winds. The tree develops a long root, and hence requires a deep moist well-drained soil. The cocoa tree can stand no frost.

The pods are cut from the trees at harvest time, split open on the ground, and the pulp is allowed to ferment and ooze out; the seeds are then dried in the sun, roasted, and the husk removed; then comes in the operation of removing the fat or 'cocoa butter' from the seeds by applying pressure; when as much fat has been pressed away as is deemed essential, the seeds go through the process of grinding. Thus at last we have the cocoa with which we are familiar. Another well-known product is chocolate, which is made by retaining some of the fat and adding sugar. The name chocolate, it is quite interesting to learn, is a variation of '*Chocolatl*', which was the name of a drink popular among

Preparation
of Cocoa.

World
Trade in
Cocoa

the natives of Mexico and South America. Before the War of 1914-18 the bulk of the world's supply of cocoa—about two-thirds of the total—used to come from Central and South America. Now the coveted position has shifted to the British West African possessions, and the plantations in the Gold Coast and Nigeria supply more than a half of the world's total. In recent years the output has increased, and it may be very near to two-thirds of the total.

Production of Cocoa¹

1909-13		1921-25		1932-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
Ecuador	17	Gold Coast	43	Gold Coast	40
Brazil	16	Brazil	11	Brazil	15
Gold Coast	15	Ecuador	9	Nigeria	10
St. Thome	13	Nigeria	7	Ivory Coast	5
Trinidad	8	Venezuela	5	Dominica	4
Dominica	6	Trinidad	5	Venezuela	3
Venezuela	5	Dominica	4	Trinidad	3
Others	20	St. Thome	3	Ecuador	2
		Others	13	Others	18
TOTAL 100		TOTAL 100		TOTAL 100	

Exporters
and
Importers

The leading exporters now are the Gold Coast, Brazil, Nigeria and the Ivory Coast, Dominica, Trinidad and the West Indies and Central American states. The leading importers are the U.S.A., Germany, the United Kingdom, Holland, France, and other European countries.

Conditions
of Growth.

Coffee.—Coffee is a product essentially of the tropical or sub-tropical lands. The coffee tree, said to be a native of the Far East, is also an evergreen plant with shiny leaves. Left to itself the tree will grow to be twenty-five or thirty feet in height, but on the plantations they are usually kept pruned down to a height of three to eight feet. It requires a moderately high temperature and an abundant

¹ Adapted from Stamp

rainfall; but more important still is perhaps an equability of temperature, and protection from the direct rays of the sun. But unlike the cocoa tree it can stand mild frost. A fertile, well-drained soil is also highly important, and clearings in forest lands are said to be ideal because of their richness of vegetable remains. The tree comes into full bearing in six years, and continues to flower and bear fruit with almost undiminished vigour till the thirty-fifth or forty-fifth year, after which the soil becomes thoroughly exhausted and must be abandoned. Many of the coffee plantations of forty or even thirty years ago, having thus been abandoned, are now practically indistinguishable from the rest of the forest.¹ It is a peculiarity of the coffee tree to flower for several months so that fruits and flowers are found on it at the same time, and hence two or three gatherings a year are needed. Coffee is obtained from the seeds or beans of the tree. Commonly two beans, with their flat sides together, are enclosed by the pulp, which, after the picking is over, is removed by soaking the berries in water or by hulling. The beans are then dried in the open air on floors of brick or tile.

Preparation
of Coffee.

The bulk of the world's coffee comes from Central and South America. In Brazil it is the leading crop; in fact, the only developed part of that enormous republic is the strip along the Atlantic coast from the mouth of the Amazon to the region of Sao Paulo, which alone produces half the world's total of coffee; "this city, being its heart and centre, has risen in sixty years from a small country town to be a place of four hundred thousand inhabitants,"² Santos, which is the natural outlet for the coffee of Sao Paulo has thus been described: "In Santos coffee absolutely dominates

World
Trade in
Coffee

¹James Bryce, *South America*, p. 390. See also Chisholm's, p. 180

²*Op. cit.*, 375.

the lives of the people. Coffee is everywhere—on the streets, in the warehouses, on the trains. Every one is busy with coffee. . . ."¹ This enormous development of the coffee industry has been put down, among other factors, to the richness of the volcanic soils around Sao Paulo. Other important coffee-producing states of South America are Colombia, Venezuela, Ecuador and the Guianas. More than three-fourths of the world's coffee comes from South America. Costa Rica in Central America and the islands of Jamaica produce high grade coffee. In Africa coffee has not yet made much headway, though Kenya has made a name for her excellent coffee. In Asia there were large plantations in Ceylon and Southern India; but most of these have long been destroyed because of a virulent disease attacking the coffee plants; at present there are small

Production of Coffee²

1909-13		1921-25		1932-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
Brazil	.. 66	Brazil	.. 69	Brazil	.. 64
Colombia	.. 6	Colombia	.. 4	Colombia	.. 10
Venezuela	.. 2	Venezuela	.. 2	Dutch East Indies	.. 5
Others	. 26	Dutch East Indies	.. 2	Venezuela	. 3
		Others	. 23	Salvador	. 2
				Guatemala	. 2
				Others	.. 14
Total 100		Total 100		Total 100	

¹R. De, C Ward, "Brazilian Country", *National Geographic Magazine* (of America), Vol xxii, p 931.

²Adapted from Stamp.

plantations in those regions, and of these the plantations in Mysore are the most important. Java still has a fairly large production to her credit—about $1/32$ of the world's total. On the seaward slopes of Southern Arabia the famous Mocha Coffee is grown in small quantities.

The chief importers are the U.S.A., and the European Importers countries, the former easily leading the rest in its consumption. Most of her supply is derived from the South American states, particularly Brazil. France, Holland, Sweden and Belgium are also great coffee-drinking countries, as the annual consumption per head in these countries show.¹ In the United Kingdom tea is more popular than coffee. Countries having colonies elsewhere generally import their coffee from their dependencies; thus there is considerable trade in this commodity between the Netherlands and the Dutch East Indies. This also is another reason why tea is a greater favourite in the U.K. than coffee.

Tea.—There is an interesting progressive specialization in respect of the localization of cocoa, coffee and tea—the three chief beverages of the world. Cocoa, as we have already seen, is essentially an equatorial product, coffee a tropical or sub-tropical plant, while tea can be grown both in the Tropics and in Warm Temperate Regions. The tea plant is said to be a native of south-east Asia, having originated somewhere in the uplands of South China, Indo-China, or India.² It is sometimes classed definitely with the sub-tropical plants.² But climatically it is said to belong “to low latitude areas where high temperatures, long growing season, and heavy, well-distributed rainfall

Conditions
of growth.

¹ Consumption per head in Holland is 19 lbs. annually, in Belgium it is 13 lbs., in Sweden 13, in the U. S. A., 12, in France 10, and in the United Kingdom only $2\frac{1}{2}$ lbs. (See Chisholm's).

² Case and Bergsmark, *College Geography*, p. 225.

³ Chisholm's *Handbook*, p. 183.

some tea, but the output is quite small. The huge production of the East is due largely to the cheapness as well as regular supplies of labour, and the meagre output of the latter countries has been put down to the shortage and consequent dearness of labour. China is the biggest producer of tea, but the largest exporter is India; Ceylon and the Dutch East Indies rank respectively second and third in export. Japanese tea is mainly green tea, and is grown chiefly for home consumption, although some of it is exported to the U.S.A. About four-fifths of India's output is grown in north-eastern India—the Brahmaputra Valley in Assam and the Duars region of Bengal; the remainder is grown in the Nilgiris in the southern part of Peninsular India. The development of the tea industry in Ceylon is partly due to the destruction of her once important coffee plantations. The Dutch East Indies may become a serious rival of Ceylon both in production and export.

export.

Great Britain is the principal importer of tea, taking nearly half the amount brought into the international market;

Export of Tea

1909-13		1921-25		1932-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
India	.. 32	India	.. 45	India	.. 31
China	.. 23	Ceylon	.. 21	Ceylon	.. 24
Ceylon	.. 22	Dutch East		Dutch East	
Dutch East		Indies	.. 12	Indies	.. 17
Indies	.. 7	China	.. 11	China	.. 9
Others	.. 16	Others	.. 11	Others	.. 19
Total 100		Total 100		Total 100	

she also re-exports some to other countries. The chief customer of India and Ceylon is, of course, Great Britain; other consumers are Russia, France, the U.S.A., Canada and Australia. Russia takes nearly one-quarter of the tea exported from Asia. She is seriously endeavouring to find out a variety that can be grown in her territories, and if the attempt comes out successful Asia's export trade will receive a great setback.

In South America is grown the maté tea, also known Maté Tea. as yerba or Paraguay tea. It grows wild in the forests of Paraguay, and is now being cultivated in the plantations of Paraguay, Uruguay, Brazil and Argentina. But it has not yet entered into the international market; the trade is restricted to the South American states.

Fruits and Wine.—Fruits which now have entered into the international market may be roughly classified into Classification the following four types:¹

(a) *Tropical and Sub-tropical fruits*, represented by bananas, pine-apples and dates;

(b) *Citrus fruits* like oranges, lemons, grapefruits and lime;

(c) *Grapes and Wine*;

(d) *Deciduous fruits*, such as apples, pears, almonds, peaches, apricots, nectarines, figs, plums and cherries.

(a) **Tropical and Sub-Tropical Fruits.**—The banana Banana. tree is a soft-stemmed plant with characteristically large leaves, and attain a height of eight to twelve feet. It is a tropical plant par excellence, and grows in humid climates. It has several varieties, most of which are rather large plants, though there is a dwarf variety which it is possible to culti-

¹ Stamp, *A Commercial Geography*, pp. 70-75.

vate in the Temperate Zone¹ This dwarf variety is now largely grown in the Canary Islands. Other varieties are grown in the Tropics. High temperature, an abundant supply of moisture, and a deep soil are essential for all the varieties. Where rainfall is not sufficient water must be supplied by means of irrigation. The plant is annual, but the root perennial. Bananas are grown almost everywhere in the Tropics. But the chief centres of commercial production are Central America (particularly, Costa Rica), Colombia, the Canaries, the West Indies and the Hawaiian Islands. The chief importers are the United States, the United Kingdom, and some of the European countries. Great care is needed to export the commodity overseas. The bunches are cut when the fruits are about three-quarters ripe, and are stored without delay in the specially constructed chambers of the fruit vessel; throughout the voyage they are kept at a constant temperature of 52°F.; even a slight rise or fall of the temperature by 2° is liable to render them wholly useless. Even after reaching the port of destination they are readily deposited in specially prepared vehicles if the commodity is to be sent any distance inland, and finally they are kept in artificial ripening chambers after reaching the centres of consumption.

Pineapple.

The pineapple plant is said to be a native of America. A moist, fertile, but light soil is essential for it; it thrives quite well on sandy soils as well on or near about seaboards. A warm tropical or sub-tropical climate is, of course, needed. It is a low-lying plant, very nearly stemless, and has long, stiff, sharp-pointed, fleshy leaves with the pine in the middle. From the point of view of international commerce it is far less important than banana. Fresh fruits are rare in the overseas trade. California, Hawaii and Singapore are the

¹ Chisholm's *Handbook*, pp. 204-205

principal centres of export, and Europe is the principal customer mainly of canned pineapple.

Dates, as is well-known, are the characteristic product of the Hot Deserts. The date-plant has, however, been introduced into California and the drier regions of Spain. Iraq is the chief exporter, and Europe as always is the chief importer. Some dates are exported from Tunis in North Africa as well.

(b) **Citrus Fruits.**—As has already been said, the citrus fruits are essentially a product of the Mediterranean Regions; but some of these thrive well in Warm Temperate and Tropical Regions also.

The orange is perhaps the typical of these fruits, or, **Orange,** at any rate, the best known of them. The orange tree is an evergreen with beautiful shiny leaves. Originally a native of China it has spread out in the Mediterranean lands, as well as in many of the Tropical and sub-tropical regions. It was introduced in Europe by the Portuguese about the middle of the sixteenth century. The bulk of North America's production comes from California and Florida. In South America the chief producers are Brazil and Tucuman (Argentina). The West Indies also have a fairly large output to their credit. Mexico in Central America may also be mentioned. In Europe the leading producers are Spain and Italy, with which Malta, Sicily and Portugal may also be mentioned. South Africa and Australia have also recently come into the line. Asia, Iran, Palestine, India—and, of course, China are the leading producers. The oranges of Nagpur and the Khasi Hills have great reputation abroad. Those of Malta and the West Indies as well as of Tucuman are also well-known for their quality. Until recently Spain and Italy together with Palestine held a sort of monopoly in the orange trade. Now the United States leads the over-

said to be 'sharp'. Spain and Portugal rank third and fourth respectively in production, and the Spanish Sherry and the Portuguese Port are said to be of the very best quality. Wine has aptly been called 'the national drink' of France, Spain, Portugal, Switzerland and Italy, as well as of Latin America.¹

(d) Deciduous Fruits.—These are the fruits of the

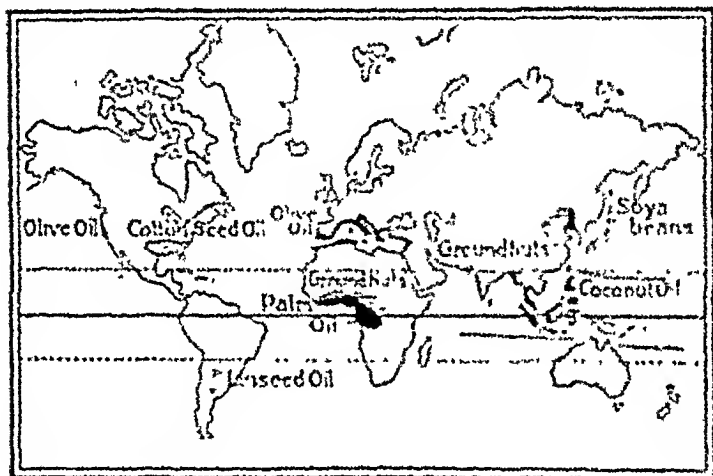
Olive. . . . deciduous trees, and include figs, apricots, peaches, nectarines, almonds, olives, etc. Of these olive is an evergreen. It is said to be a native of Asia Minor, and is practically restricted to the Mediterranean lands. It is valued both as a fruit and for obtaining olive oil. The chief olive-producing countries are Spain, Portugal, Italy, Greece and Tunis. Olive-oil, besides being used in cooking, lighting and medicine, is used in the manufacture of soaps. Italy, Greece, Tunis and Algèria are the chief exporters. Nuts are exported from the wetter parts of Mediterranean lands as well as from Brazil. Fruits of all sorts are coming more and more into the international market.

Oil-seeds and Vegetable Oils.—Vegetable oils have

Uses. . . . many uses, for human consumption margarine or artificial butter is made from them; they are required in the manufacture of soaps, candles and various other toilet preparations. Of these olive oil is perhaps the most important. Olive oil. In the countries of Southern Europe it is extensively used as a substitute for butter and animal fat. Where, again, olive oil is difficult or more expensive to obtain ground-nut oil is used as a substitute of that substitute. This is especially

¹ Stamp, *A Commercial Geography*, p. 74. It may be interesting to compare the wine-drinking countries with the beer-drinking countries. To the latter group belong Germany, United Kingdom with Ireland, Netherlands and Belgium. Roughly speaking, wine is popular among the Latin races, and beer among the Teutonic races. Brandy and whisky are also popular in Great Britain.

the east in the drier regions of China, India and West Africa, where various ground-nuts are largely grown. These nuts thrive well on sandy soils with scanty rainfall. Ground-nut unsuitable for any other crop of commercial value. The oil-palm, which grows in the Equatorial Regions and their neighbourhood, yield an abundant supply of palm oil. It is extensively used in the manufacture of soap and candle. Palm oil.



VEGETABLE OILS

as well as of artificial butter. It is cultivated in Malaya, Sumatra, and Equatorial Africa. Nigeria is the leading exporter. The coconut palm is a tropical plant, thriving well on a sandy soil, particularly in maritime regions. From it is obtained coconut oil and copra. Both the products are commercially very important. Besides, the fibre is used in making mattresses. The principal exporters are the Dutch East Indies, Malaya, Philippines, Pacific Islands, Ceylon and India. The chief importers are the U.S.A., the U.K., the U.S.S.R., Germany and France. The soya

Coconut oil and Copra.

Soya bean oil.

Other oil
and seeds

bean, which is almost a Manchurian novelty, is also an important source of vegetable oil. Manchuria is practically the sole exporter, and the U.S.A., and Japan are the chief importers. It is widely believed now that Germany has recently obtained large supplies of soya bean through the U.S.S.R., both for food and for extracting its valuable oil. The U.S.A., has also been trying to produce it at home for some time. Of various other vegetable oils those obtained from rape-seed, sesamum, linseed and cotton-seed may be mentioned here. India at present holds a sort of monopoly in rape-seed oil; sesamum oil is exported chiefly from India and China. Linseed comes from Argentina and India; it is obtained from the flax plant, but in Northern Europe the plant is grown mainly for the fibre, not so much for the seed or oil. Cotton seed and its oil is obtained from the great cotton-growing countries like the U.S.A., Egypt, India, China and the U.S.S.R.

Pepper,
Ginger,
Cinnamon,
Cloves,
Chewing-
gum

Spices.—Most of the spices are equatorial and tropical products. Pepper is shipped to Europe mainly from Malaya and the East Indies; ginger from south-eastern Asia including China, as well as from Jamaica; cinnamon from Ceylon; cloves from Zanzibar; vanilla from Java, Madagascar and Reunion; chewing-gum from Mexico.

Conditions
of growth.

Tobacco.—The tobacco plant is a native of tropical America; but it has a very wide range; it flourishes at the Equator, within the Tropics and even at the fringes of the Temperate Zones. The type and flavour of the prepared product, however, vary with the soil and climatic conditions. And yet the plant is very sensitive to frost. It requires a light soil rich in humus, lime and potash, and is an extremely exhausting plant. It exhausts the fertility of the soil in three or four years, and formerly plantations had to be abandoned frequently for new areas; now-a-days the

use of fertilizers has appreciably minimized this drawback. Tobacco is prepared from the leaves of the plant. The leading producers are the U.S.A., India, China, the Proletariat U.S.S.R., and Japan; while Philippines, Dutch East Indies, Brazil and most of the European countries as well as certain African states produce quite large quantities; it is grown also in Canada, Scotland, and the Baltic states. Majority of the countries grow it mainly for home consumption, and yet large quantities come into the international market. The chief exporters are the U.S.A., Cuba, the Dutch East Indies, Brazil, Greece, Bulgaria and Turkey. The chief importers are the United Kingdom, France and Germany.

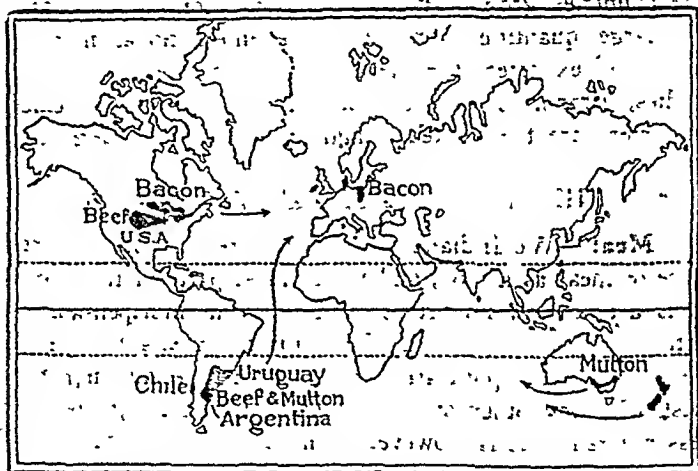
World
Trade.

III. Foodstuffs of Animal Origin

Meat.—We Indians do not quite realize the importance of meat as a food, and yet in most parts of the world it is actually an important—and often an indispensable—article for human consumption. Of the meats thus used beef, mutton and pork are of chief importance, although the flesh of many other animals is also utilized in greater or lesser extent. It is, however, of little use here to take into account the number and distribution of cattle, sheep and pigs as that is no sure indication of meat production. In India, for instance, cattle are kept in large numbers, not for meat, but mainly for ploughing, dairying and draught purposes. In many other countries they are kept not at all for draught purposes, but for meat and the dairy products. 'Beef cattle', requiring much less attention and care than their more aristocratic and lucky brethren, the 'dairy cattle', are concentrated in the great Mid-latitude Grasslands of the world. In the drier western parts of Central Plain of North America, too dry for crops, there are enormous cattle ranches; thence the cattle are sent to the Corn Belt where

Beef,
mutton and
pork.

they are fattened on maize before being sent to the slaughter-houses of Chicago. Here the meat is packed for the market. Though one of the biggest of the meat-producers, the U.S.A., does not export much beef or any other meat. Another big beef-producing area is in South America; it is the River Plate region, comprising much of Argentina, Uruguay, Paraguay and a small area of Brazil. Cattle is



THE MEAT-PRODUCING COUNTRIES OF THE WORLD

also reared in Chile. But the Plata region, particularly Argentina, is the largest beef-exporting area in the world. But in both the Americas the steady extension of agriculture, mainly of wheat, has been restricting the cattle ranches. The chief importers are the countries of north-western Europe, particularly the United Kingdom, because local supplies there are not sufficient.

As there are 'beef-cattle' and 'dairy cattle' so also sheep are either 'mutton sheep', or 'wool sheep' or even 'milk sheep'. Sheep can subsist on pasturage too small for cattle;

N. W.
Europe.

Mutton.

hence they are the most widespread of all the animals raised in the semi-arid regions of the world. The greatest concentrations of sheep are in New Zealand, South-Eastern Australia including Tasmania, South Africa, South-Eastern Europe and Italy, Great Britain, and Argentina. The United States and Russia, as well as Spain, France, Central Europe, Northern Africa, East Africa, India, Central Asia, though they contain large numbers of sheep, are relatively unimportant in number per square mile. In the international market New Zealand easily ranks as the chief exporter; the South American states like Argentina, Uruguay and Chile together rank second, and Australia comes third. By far the greatest importer is Great Britain, although mutton sheep are said to be best raised there.

Some do not require the range that is essential for both cattle and sheep, and are, therefore, easily raised in large numbers in densely populated areas. In Europe they are often fed on nuts, acorns, sugar-beet residue, etc.; in America, corn or maize and alfalfa are their chief food. Swine are omnivorous. The chief pig-raising countries are China, the U.S.A., North-Western and Central Europe, Brazil and Argentina. The meat is exported in various forms, particularly as bacon and ham. The largest exporters of bacon are Denmark, Canada, Poland and Ireland. As usual Great Britain is the principal importer. The U.S.A. exports a large amount of lard (melted pig-fat) to Britain.

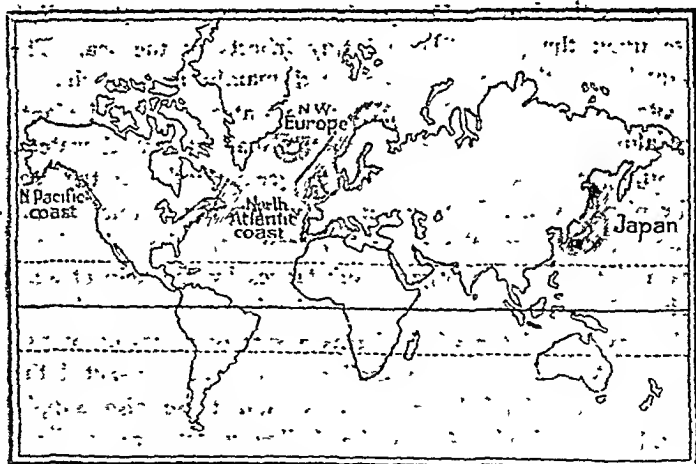
Dairy Produce.—Milk, butter and cheese are the three principal dairy products. Milk is obtained from various animals like goats, sheep, buffaloes, camels, reindeer and asses, besides the cow; but that of the cow is by far the most important. There is no international trade in fresh milk; and even in inland trade the centres of supply are in close

Reasons
for loca-
tion in
N Tempe-
rate Zone.

means edible. Used to the enormous pressure of the ocean waters many of them explode as soon as brought to surface waters or the land. The location of the major fisheries in the North Temperate Zone has also been ascribed to economic and commercial factors; they are found along the coasts of densely populated regions where there is great demand for the commodity and hence ready markets are available. Moreover, it is less difficult to preserve fish in the temperate lands than in warmer countries. The major fishing grounds of the world are:

Major
Fishing
grounds.

(1) The North Pacific Coast of Canada and the U.S.A. The principal catch are salmon, cod, halibut and



THE MAJOR FISHING GROUNDS OF THE WORLD.

herring. The salmon comes up the river mouths and creeks during the spawning season, and large numbers are then easily caught in Alaska, British Columbia and the adjacent

¹ Stamp, *A Commercial Geography*, pp 81-83

areas of the United States. Despite the enormous number of fish in the sea, long-continued and destructive methods of fishing have considerably reduced the number, especially of those that come up the rivers to spawn. The U.S.A. government has, therefore, established a department for the scientific study of the fishing industry and to encourage breeding.

(2) The North Atlantic Coast of Labrador and Newfoundland, including the Great Banks, Canada and the New England states of the U.S.A. The principal catch are cod, haddock and herring; there are also large fisheries along the coast (in-shore), for lobsters and shell-fish. This is topographically an ideal fishing ground, based, as it is, on a splendid combination of rivers, bays and shallow offshore banks.

(3) The Coasts of North-Western Europe, which extend from the North Cape along the North Sea and round the British Isles to the northern part of Africa. The fisheries round Iceland may also be included into this area. It is in all probability the largest fishing ground in the world.

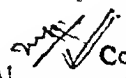
(4) The Coasts of Japan, where the principal catch are herring, haddock and sardine, as well as several other species of fish not to be found elsewhere.

Of these the fisheries of Japan easily rank first in the total number and value of catch per year; this industry in Japan gives employment to nearly 1½ million people. But the Japanese fishing products are mainly for home consumption; export trade is, therefore, small and relatively unimportant. The United Kingdom is sometimes given the second place as regards her annual catch, though the place is contested for by the United States with Alaska. The fisheries of the U.K. United Kingdom are said to employ above eight thousand

men, and it has been estimated that the whole fishing industry gives actual employment to about double the number all told.¹ She is one of the biggest exporters of fish, especially of herring. Norway is another great fishing country, employing about a hundred thousand men for at least a part of each year.² She is a great exporter, too. The U.S.A. with Alaska and Canada with Newfoundland are also great exporters of canned fish. Canned salmon is said to represent more than half the value of the total output of canned fish. By far the greatest fish-exporting region in the world is, however, North-Western Europe, and the greatest importer is Southern Europe, especially of dried fish. In exchange for the fish from N. W. Europe wines, citrus fruits, olive oil and other Mediterranean products are supplied by Southern Europe. Spain, France, Germany, Russia, East Indies, Australia and other places are also fishing countries; but in these countries the industry is of much less importance. In the export trade dried and cured cod and herrings are of foremost importance.

Apart from fish, the fishing of oysters is a very important industry. In this North America leads, with France following immediately behind. They are obtained from both natural and cultivated beds. But China has been cultivating oysters for thousands of years.

IV. THE RAW MATERIALS OF THE TEXTILE INDUSTRIES

 Cotton.—Logically speaking, the clothing of man comes immediately after food, although in actuality both are co-eval. Of the various raw materials used in clothing

¹ Chisholm's *Handbook*, p. 235.

² Case and Bergsmark, *College Geography*, p. 533.

man cotton is by far the most important.¹ It is a fibre obtained from the seed of a plant of the pod-bearing genus or order. When the pod or boll ripens it bursts open, revealing the fibres or hairs which encase the seeds therein. Raw cotton is obtained by 'ginning' i.e. by separating the hairs from the seeds. How early man discovered the use of cotton it is difficult to say; it was mentioned by Herodotus as early as the fifth century before Christ, and there are unmistakable references to its use in India as least as early as 500 B.C. It might have been a native of India. The cotton plant has a remarkable climatic range. A rich, light, well-drained sandy soil capable of retaining moisture is ideal for it; but it thrives surprisingly well on moderately poor soil also. Plenty of moisture is essential during the growing season, and a hot, moist, but not saturated atmosphere until the buds appear; this must be followed by a dry sunny season till the pods are fully ripe. When the pods burst open rain is harmful to the seed fibres. Sea breezes are extremely wholesome to the cotton plant. It is basically a dry-zone plant that tolerates moisture in the soil but not in the atmosphere. It does not flourish in areas having a rainfall of over 40 inches a year. But in many places water is to be supplied to its soil by irrigation as in Egypt, Peru, the U.S.A., and parts of India. Most of the Indian cotton is, however, grown in areas having a rainfall between 20"

¹The relative importance of each of the clothing materials (excepting skins etc.) may be realized from the following table which shows the production in thousands of metric tons for the year 1957-58:

Cotton	..	..	2829
Wool	..	..	1670
Jute	..	..	1,572
Flax	..	..	770
Artificial Silk	..	..	510
Hemp	..	..	410
Silk	..	..	250

From Stamp's *A Commercial Geography*, p. 83.

from Egypt, and the best varieties of Egyptian cotton as well as those of the Sudan and Arizona belong to this group.

Grade II, with staples above $1\frac{1}{8}$ inches. This is sometimes (as in the U.S.A.) styled long-stapled, but should better be described as *medium-stapled*. The bulk of the Egyptian, Peruvian, North Brazilian and East African (Uganda and Tanganyika) cotton belong to this group. It is wrong to style it precisely as 'Upland cotton,' as some writers are inclined to do. If, however, such an indefinite name is at all to be used in this connection, one must look upon this type as well as that belonging to grade III as a variety of 'Upland Cotton'.

Grade III, with staples carrying from $\frac{7}{8}$ inch to $1\frac{1}{8}$ inches. To this group belong the bulk of the world's total output of cotton, including most of the cotton grown in the U.S.A., Brazil (especially in the Sao Paulo region), Argentina, the U.S.S.R., and part of the Chinese and African crops as well as a third of India's output. These are decidedly short-stapled, but there are varieties even

Export of Cotton

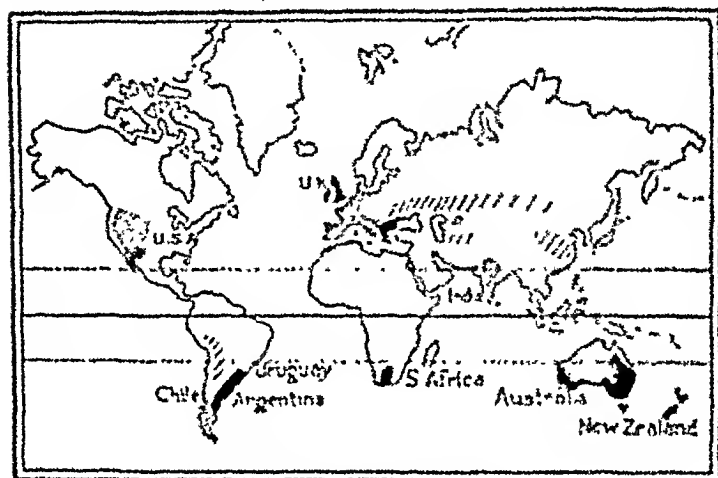
1909-13		1921-25		1932-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
U S A.	.. 52	U S A	.. 55	U S A.	.. 60
India	. 11	India	. 20	India	.. 15
Egypt	. 8	Egypt	.. 10	Egypt	.. 6
Others	. 29	Others	.. 15	China	.. 4
				U. S. S. R	.. 2
				Others	.. 13
Total 100		Total 100		- - Total 100 -	

dying and dead home industries in cotton piece-goods. Russia has been fast expanding her cotton-growing industry so as to become thoroughly self-sufficient in the matter. China does not export her raw cotton.

Conditions of Production. Wool.—Wool is of animal origin, obtained mainly from sheep. The animals reared in a cool dry climate give the best wool; but the climate must not be too severe in winter. That is why the largest wool-producing regions are in the Temperate Grasslands of the Southern Hemisphere; for the Temperate Zone Grasslands of the Northern Hemisphere suffer from too severe a cold in the winter because of the greater extent of the land masses there. Regions with a rainfall between 10 and 30 inches are ideal for sheep. Sheep kept in moist regions are very liable to suffer from certain diseases. This can, however, be prevented by providing suitable drainage conditions. The yield, as is only natural, varies from one type of sheep to another. There are also several grades of wool, varying chiefly according to the age of the animals. Thus the wool obtained from lambs seven months old is the finest.

Output. The leading wool producers are New Zealand, Australia, South Africa, the Black Sea region of Europe, United Kingdom and Argentina, Uruguay and Chile; the U.S.A., Spain, France, Northern Africa, Asia Minor, Russia, India and China are lesser producers of various grades. The grasslands of the Southern Hemisphere together contribute nearly two-thirds of the world's output; in this Australia ranks first, with New Zealand and Argentina closely following as second and third respectively; South Africa comes to occupy the fourth place, and the contribution of Uruguay is by no means quite small. There are large numbers of sheep in the United Kingdom and Ireland, and the production of wool is not inconsiderable, although the British Isles

are rather damp and the production of mutton is nearly as important there as that of wool. This is due to two reasons: many of the wool sheep are reared there in areas of compara-



The Wool-producing countries.

tive aridity, and where rainfall is abundant good drainage is not rare. Russia's output of wool is quite large, but it is used almost entirely for home consumption. The U.S.A., though possessing a large number of sheep, is behind Russia both in the number of sheep and in wool production. India and China possess numerous sheep, but the wools are poorer in quality and are used mainly for the manufacture of carpets.

Other animals providing man with wool are goats, camels, the alpaca, the llama and the vicuna. Mohair is goat's hair, supplied largely from South Africa and Turkey. Another species of goats, ranging over the mountainous regions of the Himalayas, Tibet and Southern China, provide a fleece known as the Cashmere wool; it is of very fine

Other
wools

quality. Alpaca, a type of wool obtained from the animal of that name, is a nice shiny type of wool, supplied from the Andes region of S. America. So are also the wools gathered from the llama and the vicuna. The vicuna wool is said to be the finest of all textile materials.

Conditions of
Production.

Silk.—The silkworm is not really a full-grown worm, but the caterpillar stage of several types of moths. It feeds upon the leaves of the mulberry tree, though sometimes other leaves, such as those of the oak and osage-orange, are sparingly used. When nearing the chrysalis stage the caterpillar sends out some soft material from the two minute apertures in its head, and this material hardens after coming in contact with air. The caterpillar then lies in a torpid state completely enveloped in the cocoon thus made. It is then that the cocoon is to be picked up and the poor worm destroyed by being dipped into warm water, and the silk obtained from the cocoon; otherwise it would on waking up cut through the cocoon as the imago or butterfly. The silk moth seems to be a tropical or sub-tropical insect. The average cocoon is about an inch long and contains from 300 to 500 yards of silk thread.

Production
and
Trade.

About 85 per cent of the world's output of raw silk is produced in *China* and *Japan*. China is the largest producer of raw silk. Sericulture was first practised in China probably four thousand years ago, and as a producer of silk that country still ranks highest with nearly $2\frac{1}{2}$ times as much silk as the rest of the world put together. But as an exporter her share is relatively small. Japan is the leading exporter: silk is her most valuable export, and sericulture is second only to rice culture among her industries; of all the silk of commerce Japan alone contributes four-fifths or a little more. Other important silk-producing countries are India, French Indo-China, Korea, Syria, Turkey, Italy and

France. Much smaller quantities are produced in Turkistan, Spain, South-Central Europe and the U.S.A. Italy also has a fair share in the export trade. The principal importers are the U.S.A., France, Italy and Switzerland. The U.S.A. now manufactures more silk than does any other country, but also imports large numbers of silk goods from the important manufacturing countries, particularly from France.

Artificial Silk.—In recent years rayon or artificial silk has become much more important than raw silk. It is *Serice*, produced from cellulose—wood pulp, sawdust, cotton waste, etc. Even in this Japan leads with the U.S.A. as a close second, while England, Germany and Italy contest for the third place. Production

Production of Artificial Silk¹

1924-25			1934-35		
Countries		Percentage	Countries		Percentage
U. S. A.	..	29	U. S. A.	..	29
Gr. Britain	..	17	Japan	..	13
Germany	..	16	Gr. Britain	..	12
Italy	..	14	Germany	..	11
France	..	8	Italy	..	10.75
Belgium	..	6	France	..	8
Others	..	10	Netherlands	..	3
			Belgium	..	1.25
			Other	..	12
Total 100			Total 100		

Artificial silk was virtually unknown before the World War of 1914-18. In 1924-25 the total production was 150 million lbs. only, whereas in 1934-35 it rose to be 1,099 million lbs. In 1937 Japan surpassed even the U. S. A. in the production of artificial silk.

¹ Adapted from Stamp.

Conditions
of Growth.

Flax.—The flax plant seems to have originated in the region lying between the Caspian Sea and the Persian Gulf, and its importance as a source of clothing material was known to the ancient Egyptians, Babylonians, Chaldeans and Phoenicians. The plant has now been made to spread out to other regions because of its importance, and has, therefore, a wide range. It is a simple little plant attaining a height of about 2 feet only. But it is a very exhausting plant for all that, requiring a clean, well-drained heavy soil and successive crops of flax cannot profitably be grown on the same field. The plant is an annual, and in many places the same fields are planted only once in eight or ten years. It thrives best in places free from excessive heat and draught. A humid atmosphere is best for it. Though the plant is grown in the Tropics, it is best cultivated in the cooler parts of the Temperate Zone. In the Tropics it is grown mainly for seed, in the cool Temperate Lands almost exclusively for its fibres. When the seed is in the dough and the leaves are just beginning to turn yellow, the plants are pulled up by the roots. The fibres are found in bundles around a central, woody core, and the outside of the plant has a soft cellular sheath. Flax is spun into thread and is widely used for the manufacture of linen cloth. It is also used in making twine, cordage and canvas.

Production.

By far the greatest flax-growing region of the world is in the plains of Northern Europe, forming almost a continuous 'belt' from Northern France through Belgium, Germany and the Baltic States to Russia. Russia, with the Baltic States, produces about four-fifths of the world's total flax. But Belgium grows the best fibre. Lesser producers are Northern Ireland, Northern Italy, Japan and Canada.

Jute.—Jute is the cheapest of all fibres, and ranks third so far as fibre production of all sorts is concerned; it is

a close competitor of wool, but both wool and jute fall far behind cotton in this respect. Jute is used not so much for clothing as for the manufacture of cord, twine, canvas and wrappings. The jute plant is essentially a tropical fibre crop; but it is restricted almost entirely to the Lower Gangetic plain of India. It requires a rich alluvial soil, high temperature and heavy rainfall. The plant, like flax, is an annual. A well-drained soil is ideal for its cultivation, but the plant thrives well in muddy swamps, too. The quality of the fibre and the yield per acre depend in large measure upon the preparation of the soil; the ground should be ploughed about four times and all weeds removed before the seeds are sown.

Besides the Gangetic delta which is the jute land of the world par excellence, it is grown to some extent in Ceylon, Southern China, Formosa and Malaya. But the output of all these countries put together is only one-tenth of the total jute of the world, and the huge remainder is the contribution almost entirely of the Gangetic delta. Small quantities are grown in the adjoining areas of Assam and Behar. Indian jute is exported mainly to the United Kingdom, Germany, U.S.A. and France. Lesser importers are Canada, Japan, Italy and Argentina.

Other Fibres.—Jute has several rivals, the chief of which are the different varieties of hemp. Of these Russian hemp is perhaps the best, though nothing like jute has yet been discovered or invented. Russian hemp is, however, not wholly Russian, but is grown in other parts of Europe as well. The plant is an annual, requiring a mild climate and humid atmosphere. It thrives best in loamy soils capable of retaining moisture. It is largely used in the manufacture of cordage. Manila hemp, exported mainly from the Philippines, is also extensively used in rope making.

ing. Its fibres are, however, harder than those of Russian hemp. Sisal hemp, another hard fibre, is grown in Kenya, Tanganyika and Mexico. New Zealand hemp, which, in fact, is a kind of flax, can be used for textiles. 'China Grass' is another type of fibre, grown extensively in China, and can be woven into the so-called 'grass linen' fabrics. Kapok is a light and waterproof fibre; though difficult to weave, it seems to have a fairly prosperous future.

V. OTHER VEGETABLE MATERIALS

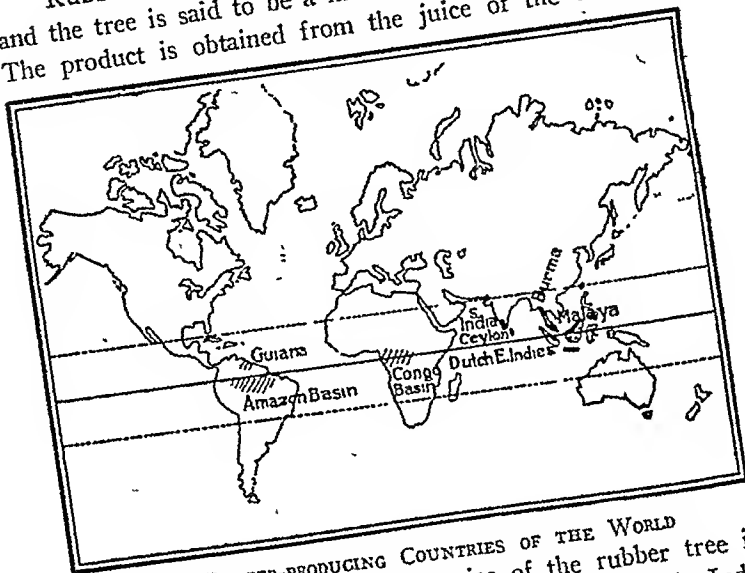
Timber.—After food and clothing the universal need of man is for shelter. And as soon as these needs are met—actually earlier—he plunges headlong into all sorts of activity—fair, foul and indifferent. But he cannot work in the vacuum, so raw materials again are essential. Moreover, most of his activities are guided by these three primary needs, and though one of these may be assigned a logical priority over another, actually all of these needs run parallel courses.

Timber may conveniently (though not scientifically) be classified into three groups (i) *Coniferous Softwoods*, (ii) *Temperate or Deciduous Hardwoods*, and (iii) *Tropical or Evergreen Hardwoods*. The principal varieties or species of coniferous softwoods are pine, firs, spruces, larches, cypresses and junipers. Temperate Hardwoods are represented by oak, birch, beech, maple, ash, walnut and elm. Tropical Hardwoods are teak, mahogany, ebony, rose wood, dye wood, etc. The sources of these woods have already been indicated in a previous chapter.

Of the total timber used by man nearly 80 per cent is softwood from the great Coniferous Forests, while of the remaining 20 per cent of hardwood about 18 per cent is

Conditions
of Growth.

Rubber.—Rubber is a typical equatorial product, and the tree is said to be a native of the Amazon Forests. The product is obtained from the juice of the tree. Al-



THE RUBBER-PRODUCING COUNTRIES OF THE WORLD

Trade.

though there are indigenous species of the rubber tree in India, the 'Para Rubber Tree' has been introduced in India, Ceylon and Malaya. It requires a rich, well-drained soil, a heavy rainfall (between 50 and 200 inches) and a moist humid climate throughout. Plantations are mostly on hill slopes because of good drainage, but special care must be taken to prevent rapid soil erosion due to excessive rain. Bulk of the product is now obtained from Malaya, the Dutch East Indies, Ceylon and Southern India; but Brazil also continues to supply some. The chief importers are the United States, the United Kingdom, other European countries, Japan and Russia. The demand, as well as the consequent production, for rubber has been growing by leaps and bounds; the average annual production during 1909-13 was

6. Name the most important rice-importing countries of the world. From what sources is rice imported into Great Britain and to countries of Northern Europe? What is the present position of India including Burma in this export trade? (C U B. Com., '30).

7. Into how many classes is cotton divided? Give a short account of the chief sources of supply of the principal varieties of cotton. (C U. Inter., '36).

8. What are the climatic conditions favouring the growth of coffee and tea? What are the principal countries of production and export? (C. U. Inter., '34 and U. P. Inter., '40).

9. Discuss the conditions favouring the growth of (a) jute, (b) oil seeds, (c) coffee and (d) sugar-cane. (C. U. Inter., '35).

10. What climatic conditions are favourable or unfavourable to the cultivation of rice, cotton and sugar-cane? Explain the reasons. (C U. Inter., '40).

11. What conditions are necessary for the successful cultivation of beet and sugar-cane? State accurately the areas in which sugar is manufactured. India produces large quantities of sugar-cane, but still imports sugar from other countries. Why? (I. P. S., '30).

12. What are the necessary conditions for the production of the following (a) rubber and (b) beet? Name the principal countries in which these are produced. (C U. Inter., '27).

13. Describe the geographical circumstances favouring the growth and the world distribution of sugar beet and sugar-cane. (C U. Inter., '31, '33).

14. What are the most important countries of the world exporting cotton in considerable quantities? Describe fully the conditions of production and quality of cotton produced in each. (C. U. Inter., '32; U. P. Inter., '32).

15. Describe the most favourable conditions for the production of the following commodities and mention their places of production:—
a) Rice (b) Tea (c) Coffee (d) Cotton. (U. P. Inter., 1931).

16. Name the principal silk-producing countries of the world. Do you think that artificial silk is competing seriously with natural silk? (Cal B Com '34).

CHAPTER V

MINERAL PRODUCTS

Minerals.—The lithosphere or the crust of the earth consists of a variety of rocks, and a rock itself is a mineral, ^{primary} igneous or stratified, constituting the solid crust of the earth. ^{secondary} This rather circular description is not of much avail except for calling attention to the fact that minerals are not only hidden from our view deep down into the bowels of the earth, but also lie scattered all about us. A mineral may briefly ^{Mineral} be defined as a "naturally occurring chemical compound ^{element} either constant in its composition or varying within narrow limits."¹ But all this should not lead us to suppose that the lithosphere is the only storehouse of minerals; the central nucleus of the earth or the barysphere is probably made up almost entirely of pure iron with a certain admixture of ^{sources of} nickel and other metals. But it is far too deep for us to ^{minerals} penetrate, and, besides, not beyond comprehension. Our entire mineral resources are derived from the lithosphere alone. Rocks mostly are mixtures of various minerals, though sometimes they may represent only one or two of them. Minerals may be broadly divided into two categories—(a) *metallic* and (b) *non-metallic*. Among the metallic ^{metals and} minerals are iron, copper, lead, tin, mercury, gold and silver. ^{Non-metallic} These are not, however, found in a pure state, but are usually ^{minerals} mixed up with other elements or substances; that is what is meant by saying that the metals occur in 'ores'. In order to obtain a pure metal, it has to be separated from its ore. ^{Metallic} Sometimes the important metallic minerals are found in ^{ores}

¹ Stamp, *A Commercial Geography*, p. 104-5.

Metallic
veins.

'veins', which, in reality, are the faults or cracks in the earth's crust along which molten rock, vapours etc., once made their way from the interior strata of the earth's crust towards the surface, but became solidified in the cracks on the way. Non-metallic minerals are represented by coal, petroleum, salt, sulphur, clay, building stones, etc. They are more numerous than are the metals.

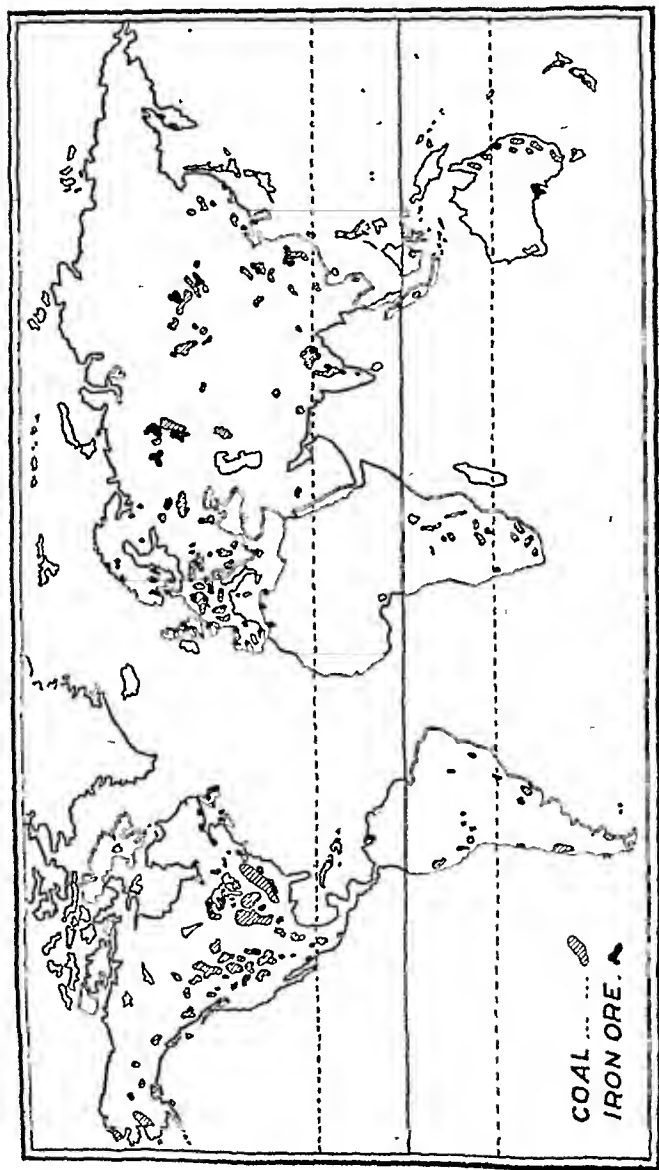
I. THE METALLIC MINERALS

Iron.—Iron, though not a 'precious metal', is the most valuable and useful of all the metallic minerals, and has perhaps the widest distribution. The place it holds in the life of modern man needs no elucidation, and it has been said that there are few rocks which do not contain a certain percentage of iron. The familiar red colour of many of the rocks is most often due to the presence of iron oxide, which is a compound of oxygen with iron. But such a metallic content in the rocks is not, or, has not yet been made, economically useful. Iron ores obtained from mines are the only useful source. But ores differ considerably in their iron content, as well as in other materials. Four chemical groups have thus been distinguished.

Chemical
groups of
iron ore.

(a) *The Iron Oxides*, which may be of several varieties; but *hematite* (Fe_2O_3) or red ore and *magnetite* (Fe_3O_4) are the chief variations of this group. *Hematite* is usually red—'blood-like', and hence the name; but it may also be a brown or blackish iron ore. *Magnetite* is magnetic iron oxide, and of a decidedly black hue; it, too, has certain variations. These are said to be the purest form of iron. The ores of Sweden are of this type.

(b) *The Hydrated Oxides*, of which *limonite* ($2\text{FeO}_3 \cdot 3\text{H}_2\text{O}$) is the chief sub-type. It is a brown ore;



THE COAL & IRON-ORE PRODUCING COUNTRIES OF THE WORLD

The U.S.S.R., has iron-ores of good quality in Krivoi Rog and Magnet Mountain near which is the town of Magnitogorsk, an important iron and steel centre. Iron ore, although it has not been worked to any great extent yet, is known to exist in the Kuznetsk coal basin and in the neighbourhood of Minusinsk. In France the bulk of iron-ore is obtained from Lorraine. There are deposits also on the Le Creuzot fields. In Great Britain the Cleveland hills was for many years the largest non-ore producing area but it has been surpassed by Lincolnshire, Leicestershire, Northamptonshire and Oxfordshire. The ores are of low grade but inexpensive to work. High grade ore is mined in smaller quantities in the Furness district of Lancashire. The home production is quite inadequate for its needs and iron-ore has to be imported from Spain and

Principal Iron-Ore Producing Countries

In thousands of Metric Tons.

	1930		1936
U. S. A.	.. 59,346	U. S. A.	.. 51,000
France	.. 48,457	France	.. 33,187
U. K.	.. 11,814	U. S. S. R.	.. 27,918
Sweden	.. 11,236	U. K.	.. 12,905
U. S. S. R.	.. 10,234	Sweden	.. 11,250
Germany	.. 5,659	Germany	.. 6,499
Spain	.. 5,525	Spain	.. 2,633
India	.. 1,879	India	.. 2,165

Sweden. The chief German deposits are in Siegerland, Silesia and near Hanover. Spain has very rich deposits of high-grade hematites, mainly in the north. Iron ore occurs in North Sweden in the Gellivara and Kirunavara areas. In India iron occurs mainly in the provinces of Bihar, Orissa and Mysore. Iron ore is widely distributed in China. The chief areas of production are Hupeh, Shanshi and Szechwan. The ores of Shanshi are of good quality. Minor producers of iron-ore are Belgium and

Production of
Iron
and Steel.

Next comes Chile with an annual output of a little above 200 thousand tons. A close third is Central Africa with an annual output in the same year of about 170 thousand tons, followed by Canada with a total production of nearly 150 thousand tons. Japan, which is usually rather poor in mineral reserves, is an important producer of this red metal' (about 80 thousand tons in 1930) Mexico is hardly inferior to Japan. Other important producers are Russia, Peru, and the Iberian Peninsula (Spain-Portugal). Many are of opinion that the richest reserves of copper, however, lie in Central Africa, partly in the territory of Rhodesia and partly in the neighbouring parts of the Belgian Congo. The U.S.A., although still ranking highest in the scale of production, has, however, got to import large quantities of copper from other countries for its electrical and automobile industries.

Lead.—Lead ranks third among metals in the scale of production and second in the diversity of usefulness¹. It is used in the manufacture of automobiles, airplanes, locomotives, typewriters, calculating machines, printing materials, musical instruments, rifles, shots, bullets, electrical equipment like batteries and cable-covering, paints and a host of other things. Like copper it is obtained chiefly from ores, and is commonly found associated with igneous and metamorphic rocks. It is often found along with a small percentage of silver and zinc, and that is why sometimes these three metals—lead, silver and zinc—are mined from the same source.

¹Iron comes first both in production and usefulness; the figures for 1929 show that it comprised about 95-per cent of all the metals used. Copper is second in output, but preceded by lead in point of usefulness. See Case & Bergsmark, *College Geography*, pp 541—'63 & pp 610—'23

North America is the world's greatest storehouse of lead as of many other metals. The U.S.A., is the largest producer, and along with Canada and Mexico supplies half the world's total. Individually Mexico is the second largest producer of lead, with about 250 thousand metric tons to her credit; this is a little less than half of what the U.S.A. produced in 1930. Australia and Canada are the closest rivals for the third place, each with an annual output of more than 150 thousand metric tons. Other important producers are Spain and Germany, both close rivals for the fourth place with more than 100 thousand metric tons each, and Burma with about 80 thousand and Belgium with about 60 thousand of metric tons respectively. Italy and France are of comparatively lesser importance. The U.S.A., although the largest producer, has again to import large quantities of lead from Mexico, Canada, Spain and Australia for domestic consumption. Production.

Zinc.—Zinc ores are often found in countries where lead is abundant. The leading producers are the U.S.A., Belgium, Poland, Canada, Germany, and France, and with them may also be named Australia and Great Britain. Norway, Holland and Italy are lesser producers. The U.S.A. is easily the biggest producer; its total production in 1930 was about 450 thousand of metric tons. Belgium and Poland may be bracketted together as second; each produced about 180 thousand metric tons. Canada and Germany, again, are close rivals for the third place, with an output of a little more and a little less respectively than 100 thousand metric tons. The output of France also is not much less than that of Germany. The contributions of Australia and Great Britain are much lower, about 50 thousand metric tons each. Production.

menal increase, during the last two decades its output is said to have increased 200 per cent. It is also used in the manufacture of furniture, kitchen ware, optical goods, scientific instruments and paints. It is a fairly good conductor of electricity and possesses a high thermal conductivity. But it is more expensive than either iron or steel. Like iron it is quite abundant in nature, and is very widely distributed. But the task of separating it from the ore is generally very difficult and costly. Bauxite is a kind of aluminium ore which, however, is comparatively easy of exploitation, and contains the highest percentage of the metal. France has the largest known reserves of bauxite in the world; other important deposits are found in the Guianas and the U.S.A.; lesser deposits of bauxite are found chiefly in Jugoslavia, Italy and Hungary.

Yet the largest producer of aluminium is the United States with about two-fifths of the world's production to her credit. Canada comes next; but her contribution is less than two-fifths of that of the U.S.A. France ranks third in the scale of production with about three-fifths of Canada's output, followed closely by Germany and Norway. Switzerland ranks sixth with about two-thirds of the total output of France, and is followed closely by Great Britain. Among the leading producers of aluminium Italy holds the last place with about half the output of Switzerland.

Gold.—Gold is one of the precious metals, and though not really the most precious it can well be called 'the king of metals.' The appellation is not whimsical; for it is actually a very remarkable metal. It does not rust as does iron, nor does it change into a sulphide as does silver. It is thus a very stable metal. Gold is usually found 'native' in nature. Its sources may be broadly divided into two classes: (1) *Alluvial or placer deposits* and (2) *Reef or lode deposits*.

(1) *Alluvial or placer deposits* occur as a result of the washing out of the parent rock by streams and are found in beds carved out by them. These streams must originate or pass through gold-bearing regions. The metal, however, is heavy, and the streams can thus carry on the work of transportation so long as there is high force in the current, as the force of the current begins to diminish the gold begins to be deposited in the beds and in course of time get concentrated in certain parts of them. These richer parts of the beds are called 'pay streaks.' The gold thus deposited may occur either as particles and dust or in larger masses called nuggets. The work of the miner in getting placer gold is quite simple,—he is required only to wash the gold out of mud and soil and thus gather a rich harvest with ease. But sometimes the gold particles occur in the form of microscopic dust; then they have to be separated out and collected by chemical means. Unless a gold-bearing river bed be very extensive, the deposits are quickly worked out and no gold is left. Sometimes, again, placer gold is found in a metamorphosed state so that the deposits look like bankets or reefs as is the case with those of the Witwatersrand in the Transvaal, Africa.

(1) Alluvial
or placer
deposits

(2) *The reef or lode deposits* are usually found in igneous rocks, and often up to great depths in the earth's crust, *i.e.*, in mines. The lodes generally contain much useless minerals as well, and have to be separated by crushing. Placer gold deposits when metamorphosed into hard siliceous masses deep down into the earth have also the appearance of mines.

Reef
or lode
deposits.

The gold production of the world since the beginning of the opening decade of the present century has remained remarkably constant, the annual output being in the neigh-

World
production
of Gold

World Production of Gold¹

1913			1923			1935		
Countries	Percentage		Countries	Percentage		Countries	Percentage	
Union of South Africa	. 39		Union of South Africa	. 47		Union of South Africa	. 49	
U S A	. 19		U S A.	. 15		Canada	. 15	
Australia	.. 10		Canada	. 7		U. S S R	. 12	
Mexico	.. 3		Mexico	. 4		U S. A.	.. 11	
Canada	.. 3		Australia	.. 4		Australia	.. 5	
S Rhodesia	.. 3		S. Rhodesia	.. 3		South America	.. 4	
India	. 2		India	.. 2		S Rhodesia	.. 2	
Others	. 21		Others	.. 18		Others	.. 2	
TOTAL 100			TOTAL 100			TOTAL 100		

The total output in 1913 was 22·8 million fine ounces, in 1923 it came down to 19·6 and rose in 1933 to be 22·5 fine oz. In 1937 it shot up to as much as 35·5 million fine oz.²

The uses of gold for coins and jewellery are well-known. Its rarity, its beauty and durability together with the fact that it is easily worked have caused it to be not only highly prized, but also to serve as a standard of evaluation in our economic and commercial transactions. But gold has many essential industrial and medicinal uses as well. And yet the combined value of all the gold the world produces annually together with that of the world's annual production of silver is not enough, in any normal year, to purchase the agricul-

¹ Adapted from Stamp, *A Commercial Geography*, p. 111

² It would be interesting to study the world production of gold, the most prized of the metals, as well as that of silver and to speculate why gold has remained so fairly constant. H. B. Killough and L. W. Killough give the figures for a considerable period from 1493 to 1930. Obviously, however, the estimates relating to recent years seem to be much more accurate than those which deal with the past centuries. See *Raw Materials of Industrialism and Mineral Industry*

tural products of any of the major provinces of India. The average yearly output of the world's gold may be roughly valued at Rs. 150 crores at the present rate of exchange.

Silver.—The bulk of the world's silver, unlike that of gold, is not found 'native' in nature. Native silver is rare; most of it—no less than two-thirds—is found associated with lead, and that is why, generally speaking, the important lead-producing countries are also important silver-producing regions. Besides, much silver is obtained from gold and copper ores. Silver rarely, if at all, occurs as alluvial deposits. Sources

Mexico is the largest producer of silver in the world, her contribution being a little above a third of the world's total. The U. S. A. comes second and Canada holds the third place. Thus the North American Continent as a whole is by far the largest producer of this metal with about two-thirds of the world's total silver output. Peru and Bolivia in South America are also important producers. In Europe, Germany and Spain are important, and in Asia the two most noteworthy producers are Burma and Japan. Australia is also not an insignificant producer. Production.

During 1909-13 the world's annual output was 230 million ounces, during 1921-25 it rose to be 240 and in 1931-35 it was 180 million oz. Mexico has been the leading silver-producer since the days of Spanish conquest and yet shows little sign of exhaustion.

Silver is harder and less beautiful than gold; moreover it, unlike gold, turns into sulphide though slowly, and this is what is generally known as the tarnishing of silver. It is also much more widely distributed than is gold, and, of course, much cheaper. Besides being used in coinage and jewellery of lesser value, it is largely and more generally Uses of Silver.

World Production of Silver¹

1909-13		1921-25		1931-35	
Countries	Percentage	Countries	Percentage	Countries	Percentage
<i>N. America—</i>		<i>N. America—</i>		<i>N. America—</i>	
Mexico	32	Mexico	36	Mexico	42
U S A.	24	U S A.	27	U. S A.	15
Canada	13	Canada	8	Canada	10
<i>Central America</i>	1	<i>Central America</i>	1	<i>C America</i>	2
<i>S. America—</i>		<i>S. America—</i>		<i>S America—</i>	
Peru	3	Peru	6	Peru	4
Others	4	Bolivia	2	Bolivia	3
<i>Asia</i>	3	Others	2	Others	1
<i>Europe—</i>		<i>Asia</i>		<i>Asia—</i>	
Germany	6	<i>Europe</i>	4	Japan	2
Others	5	<i>Australia</i>	4	Burma	2
<i>Australia</i>	6	Others	5	Others	3
Others	3			<i>Africa</i>	3
				<i>Europe—</i>	
				Germany	4
				Spain	2
				Others	1
				<i>Australia</i>	6
TOTAL 100		TOTAL 100		TOTAL 100	

used in industry: tableware and plate of various kinds are made of it

Platinum.—Platinum, like gold and silver, is a 'precious metal' It is even much rarer than gold, and consequently more precious, though not so highly prized by all and sundry. The biggest producer is Russia, particularly the Urals Rhodesia probably comes next The U. S. A., is also another important producer. Some amount of the metal is obtained from Colombia as well It is one of the essential minerals for the manufacture of laboratory utensils,

¹ Adapted from Stamp.

because it is highly resistant to acids and temperature. It is extensively used in photography and electrical business. Like gold and silver it has a demand in dentistry and jewellery business.

Quicksilver.—Quicksilver commonly occurs in the form of sulphide of mercury or cinnabar. In order to procure it the ore is heated or 'roasted' and the vapour collected and condensed. Its density is very high—13·6, and it readily changes in volume with the fluctuations of temperature. So mercury is used in thermometers, barometers and hygrometers. It is also used in separating gold from impurities as it easily forms an amalgam with gold when mixed with the latter. It has many other uses—industrial as well as medicinal. It is combined with tin to coat the backs of mirrors, is used extensively in the manufacture of explosive caps, and so on. The chief producers of mercury or quicksilver are Spain, the United States, Austria, Italy and Russia.

Manganese-ore.—The importance of manganese is for its use in the steel industry. It makes steel tough and tenacious. The U.S.S.R., is the chief producer, the important areas being Georgia and Nikopol district. The U.S.S.R., produces about 45 per cent. of the world output. India comes next with about 1/5th of the world output to her credit. The deposits are in C. P., Madras, Bombay, Bihar, Orissa and Mysore. Other producers are Gold Coast, Germany, Egypt, Brazil and the U. S. A.

Minor Metals.—It is not possible here for reasons of space to give an exhaustive list of all the metals; but the more important of the minor metals may be mentioned. *Tungsten*, for example, is such a one. It is used in the manufacture of steel—for the production of different kinds of steel. The quantity required is, however, small, but

nonetheless essential. China is perhaps the leading producer of tungsten, and Burma probably comes next. Other important producers are U. S. A., Malaya and Bolivia.

Another important ingredient of steel is *Chromium*. It is specially noted for rendering steel stainless. Moreover, chromium is extensively used in the manufacture of certain paints. Rhodesia is the leading producer and Yugoslavia comes next. Other important producers are South Africa and India.

Magnesium—It is used in the manufacture of refractory bricks (fire bricks); for lining electric furnaces and in medicine. It is found in India in the chalk hills near Salem, in Coorg and in the Mysore state.

Nickel is used in steel making, plating and coining. Nickel-steel is hard and elastic and is used in the manufacture of parts of watches, propeller, cables, scales, etc. Sudbury district of Ontario in Canada produces more than 85 per cent. of the world's total output. Other producers are New Caledonia and U.S.S.R.

Antimony—It is used to give hardness to softer metals in various alloys and particularly in the making of type metal, bell-metal and Britannia metal. The ore is principally obtained from China. India has large reserves of this metal in the Punjab and Mysore.

II. NON-METALLIC MINERALS

Non-Metallic Minerals.—Non-metallic minerals are very numerous,—in fact, more numerous than are the metals. They are generally more abundant and widely distributed in nature, and are consequently cheaper, but not necessarily less important. These non-metallic minerals are represented by coal and petroleum, salt and sulphur, building stones and clays. Of these coal and petroleum are of primary importance; they are the chief sources of industrial power, and

on that account merit a more detailed treatment in a separate chapter.

Salt.—Common salt is often chemically known as halite. It is one of the indispensable necessities of life, and contains 60·6 per cent of sodium and 39·4 per cent. of chlorine. It occurs extensively in the crust of the earth in a solid form. This is called rock salt, and is often found in the form of brine. Salt is also obtained from sea water, as well as from the inland waters such as the Dead Sea, the Great Salt Lake, etc. Salt is very widely distributed. It has been estimated that from each 100 pounds of sea-water about three and a half pounds of mineral may be obtained by evaporating the water, and the bulk of this mineral matter is common salt. There are rich deposits of rock salt in various countries. And in many places the salt industry is a government monopoly. Besides being used in food, salt is essential in packing and preserving fish, meat, hides, butter, pickles and hay. It is used also in the manufacture of soda, glass, bleaching powder, pottery and the refining of silver.

Nature.

Distribution

Uses.

Sulphur.—Sulphur, unlike salt, is not widely distributed, being found generally in the volcanic regions. It is used in medicine, in vulcanizing rubber, manufacturing gunpowder and in drying peaches, apricots and other deciduous fruits. Sulphuric acid is required for the manufacture of glass, matches, alum, kerosene, aniline colours, blue vitriol, green vitriol, etc. Sulphurous acid is used in the production of paper pulp, in bleaching and in various disinfectants. The leading producer of sulphur is the island of Sicily; next in order comes Japan, and the third place is occupied by the U. S. A. There are about one thousand sulphur mines in Sicily and Italy put together, yielding more than half a million tons a year.

Distribution and uses.

Production

Mineral Waters.—The waters of certain springs and pools are famed for their medicinal value—real or supposed. Anyway, the reputation of such waters has led to the growth of towns and cities in their neighbourhood. Such are the towns of Bath in England, Vichy in France, Baden in Germany, Carlsbad in Austria, Saratoga in New York. We in India, too, have no dearth of such mineral springs and towns associated with them; moreover, most of these in our country are looked upon as sacred places and thousands visit them yearly on pilgrimage. Now-a-days great quantities of mineral waters are bottled and shipped for distant places so that it has grown into an industry of considerable importance. It has been estimated that the average annual value of the mineral water sold in the U S A from the springs and pools of that country alone comes up to about 5 million dollars¹

Asbestos.—This mineral is used for the manufacture of fire resisters, gas stoves, etc. It is non-conductor of heat. Canada is the leading producer and accounts for about three-fifths of the world total. The deposits are found in S. Quebec.

Diamonds.—Diamonds are the most important of the various precious stones. It is also said to be the hardest substance yet known. In composition, however, nothing can be more simple than this coveted jewel; for it is pure carbon. But not all diamonds are valuable; for there *are* black

¹ The term 'mineral water' is to some extent, misleading, because all ground water contains minerals. The amount of mineral matter is determined by the length of time water has remained underground, the temperature of the water and the constituents and character of the rock with which it has come into contact. We speak of 'mineral water' when the mineral content is high and appreciable because of taste, odour or colour.

diamonds which are useless as gems, they are used as tips for rock drills.

The leading producer of diamond is South Africa, the diamond mines near Kimberley are world-famous. Other important producers are Brazil and India. The chief centres for the cutting and polishing of this precious stone were Amsterdam in Holland and Antwerp in Belgium, and the chief market is the U.S.A. The European War II completely upset the diamond business of Amsterdam and Antwerp; many of the diamond merchants have now migrated to London.

Producers
and
Markets

Mica.—It is indispensable for its use as insulator in the electrical industry. India is the most important mica-producing country of the world. Other producing countries are the U.S.A., Canada, East Africa and Brazil.

Mica.

Mineral Fertilizers—Of the various mineral fertilizers found in nature the best known is perhaps *Sodium Nitrate*. It is really a very soluble salt, and is found in large quantities in the temperate desert regions. Northern Chile is the leading producer of this mineral, and formerly it was the main export of that country. The countries practising intensive agriculture like the U.S.A., the countries of Northern Europe and Egypt were her chief customers. But the invention of artificial mineral fertilizers has adversely interfered with this trade. Another natural mineral fertilizer is *Phosphates*, found native in huge deposits in Algeria, Tunis, Florida, the Pacific Islands of Nauru and Ocean Island. But the trade in phosphates has also been affected by a slump owing to the advent in the field of artificial phosphates. Of the various artificial fertilizers may be named *calcium nitrate*, produced in large quantities in Norway, *sulphate of ammonia*, and the various *potash salts*.

Sodium
Nitrate.

Phosphates.

was a rarity bricks came to be of primary use in the construction of houses and dwelling places. Thus the great Chaldean and Assyrian palaces were built almost exclusively of sun-dried bricks. So it was in Egypt and in Mohenjodaro and Harappa in our country. Clay is formed as a result of the decomposition of various minerals, particularly feldspar. It has the capacity to absorb various substances and these substances easily solidify and harden the clay when dried in the sun or baked in the fire. The commonest form of clay used in the building purposes is, of course, brick. When clay is combined with brick and dried or baked, the resulting brick takes on great strength and furnishes an excellent building material. From clay we have quite a number of such materials—building brick, fire-brick, paving-brick, as well as pottery, drain-tiles, roofing-tiles, sewer-pipe, and to a small extent it is used in the manufacture of paper.

In the manufacture of pottery, however, the purest form of clay is now more extensively used. This substance is known as *Kaolin*.

Cement.—Cement is manufactured primarily from limestone and clay. It, too, is no new novelty, for it has been known in Europe since Roman times. Now-a-days it is re-inforced by steel and makes quite a durable structure. The uses of cement are obvious. It is used in the building of bridges, brick edifices and other structures meant to stand high strain or great weight.

STUDIES AND QUESTIONS

1. Write short notes on any six of the following, indicating the countries where each may be found—(a) Asbestos, (b) Copper, (c) Manganese, (d) Mica, (e) Nickel, (f) Tin, (g) Saltpetre, (h) Zinc. (CU Inter, 1930)

2. Write short notes on the use of any *four* of the following and also state their sources of supply.—(a) Platinum, (b) Mica, (c) Zinc, (d) Copper, (e) Manganese and (f) Graphite (C. U. Inter. 1938).

3. Write short notes on the following, stating the places where they are to be found:—(a) Copper, (b) Mica, (c) Tin, (d) Lead (C. U. Inter. 1939)

4. Write short notes on the use of any *five* of the following, indicating the countries where each may be found.—(a) Copper, (b) Mica, (c) Tin, (d) Zinc (e) Gold, (f) Manganese (C. U. Inter. 1942).

5. Discuss the distribution of non-ferrous metals in the British Empire, with special reference to the sources of supply within British India. (C. U. B. Com. 1934)

6. Name the sources of supply of Silver, mentioning the processes by which the metal is obtained in those places (C. U. B. Com. 1936).

7. State the importance of the following metals in the metallurgical industries.—(a) Nickel, (b) Aluminum, (c) Antimony, (d) Magnesium, and where are these metals mainly found? Has India any share in their production? (C. U. B. Com. 1941).

CHAPTER VI

FUEL AND POWER

Sources.—Fuel and power are inseparable as the one supplies the other. And yet the former is not the only source of power; for wind and moving water, amongst others, are also good sources of power. In the past, wood and its derivative, charcoal, were the two great sources of fuel, and hence of power as well. Nowadays the force of the wind is far less employed than formerly, though that of running water is still harnessed. Industrial alcohol is widely used as fuel in many countries; the Germans particularly have made almost a specialty of it; it is derived from potatoes. In South Africa, again, they obtain motor spirits from sugar. But the present-day sources of power pre-eminently are coal and oil.

Coal.—As has already been noted in the last chapter, both coal and oil (petroleum) are minerals. They are of organic origin and occur in sedimentary rocks. Coal is actually an organic sedimentary rock. 'It is a mineral substance of a dark brown or black colour, composed of the remains of plants and containing such proportions of carbon and hydrogen that it can be used as a fuel.' "We can picture the forest from which the coal has been formed as a huge level swamp with a muddy floor covered perhaps with water. Successive generations of plants very different from those growing at the present day, but including many that resembled tree ferns, grew, thrived and decayed and gave rise to a mass of decaying vegetation in the stagnant water. This process of accumulation was terminated by a series of earth movements or earthquakes, and the whole

area was overwhelmed by masses of sand or other sediment and so buried.¹ Thus, in short, is the age-long history of coal formation. Coal occurs in layers called seams. A coal seam originating from forests of long duration is naturally thick; where, on the contrary, forests were of shorter duration the resulting coal seams are thin. It is interesting to note that the swamp forests which have been changed into coal were very widely spread in a certain period of the earth's history, and consequently the bulk of the world's coal measures was formed at a certain geological age, this period has accordingly been called the 'Carboniferous Age'. But though the Carboniferous Age was the great coal-forming period in the earth's history as the Tertiary was the great mountain-building age, coal seams of lesser extent generally are found in the rocks of nearly all the geological ages. Some of the coal seams have as yet been little disturbed by great earth-building movements, while others have been bent and broken to a remarkable degree. The great coalfield of Pennsylvania, U.S.A., is an instance of the former kind, the seams, having been little disturbed, can be followed over an extensive stretch of land and are very nearly horizontal in position. Most of the coalfields of Britain and the European continent are much folded and broken by great faults and can, therefore, be followed for short distances. Many of the Belgian coal seams have been largely crushed by earth movements of unimaginable intensity. Coal is singularly devoid of potash and consequently its ashes are of no value as a fertilizer. This peculiar feature of coal has been ascribed to the fact that during the submergence of the vegetation the salts such as potash were thoroughly dissolved. The seams or layers of coal vary in thickness from a few inches to several feet. They are separated from one another

Carboni-
ferous
Age

¹ Stamp, *A Commercial Geography*, p. 117

by the intervening layers of sedimentary rock, generally of shale or sandstone and occasionally of limestone

Coal, however, is of many types ¹

(1) *Brown Coal or lignite* most of the younger coals belong to this type; for in it we find that the vegetation has not been completely changed into coal, and so it contains a proportion of the original fragments of wood or leaves which constituted the parent material. Moreover, lignites very often contain a relatively large proportion of moisture, and so these may break up into small fragments after mining. Many countries possess extensive fields of this type of coal. Germany and Australia have such coal measures. In Germany 9 tons of lignite are generally found to be equivalent to 2 tons of good coal

(2) *Cannel Coals*, said to be a curious type of coal which give a long smoky flame. It is neither important nor abundant

(3) *Humic or Bituminous Coals*, which include many of coals of commoner use. Those which readily form coke are called 'coking coals', those most suitable for raising steam are known as 'steam coals'. There is a soft variety which gives out a brilliant flame and since this is most suitable for household purposes, it is called 'household coal'. There is another variety which is hard and is extensively used in steamers and for export.

(4) *Anthracite*, probably the best type of coal when all things are considered. It is very hard and bright, and does not readily ignite; but since it contains the lowest percentage of volatile matter, it, if once alight, gives out a very intense heat

This differentiation of the coals probably requires a little more explanation. Let us recall the process of coal

¹ Stamp *A Commercial Geography*, pp 118-119

formation. When sediments accumulate in huge quantities, the accumulated mass of material naturally exert great pressure and generate heat; the vegetable matter thus gets greatly compressed and otherwise changed—almost metamorphosed. A given thickness of coal, it has been estimated, represents nearly 7 per cent of the original thickness of the layer of vegetation entering into the formation. Thus about 14 feet of vegetable matter is represented by only one foot of coal. While coal is being formed—obviously a very slow and durable process—hydrogen, oxygen and nitrogen are given off; this results in a relative increase of carbon at each successive stage, and that relative amount of carbon determines the character of the coal. This may be summarized by the following table.¹

		Carbon per cent.	Hydrogen per cent.	Oxygen per cent.	Nitrogen per cent.	Composition of different types of Coal.
Wood	..	50	6	43	1	
Peat	..	50	6	33	2	
Lignite	..	69	5.5	25	0.8	
Bituminous	..	82	5.0	1.3	0.8	
Anthracite	..	95	2.5	2.5	Trace	

The coal resources of the world have been measured by experts. It has been estimated that within 6,000 feet of the earth's surface there lie hidden approximately 8,000 billion tons of coal,—an amount said to be large enough to last the world roughly 4,000 years if the present rate of consumption remains constant till the advent of that remote age.² And this estimate has been conducted on the assumption that one-fourth of the coal will be lost because of defective methods of mining. The distribution of coal measures has thus been estimated:

Coal
reserves of
the World.

¹ Chamberlain, *Geography*, p. 315. The figures represent average conditions only.

² Case & Bergsmark, *College Geography*, p. 571.

The Coal reserves of the World.¹

North America—

U. S. A.	43.5	p.c.
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Canada	..		5.5	„
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Asia (including Russia)—

China	.	..	5.75	„
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Others	.	..	2.25	„
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U. S. S. R.		..	22	„
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Europe (excluding Russia)—

Germany	7.75	„
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U K		..	4	„
-----	--	----	---	---

Others			3.25	„
--------	--	--	------	---

Australia	.	..	3	„
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Africa	.		2.25	„
--------	---	--	------	---

South America	.	.	.75	„
---------------	---	---	-----	---

TOTAL	..	100	p.c.
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Thus North America has nearly half the world's coal known to exist². Asia with the bulk of her deposits in Siberia and China shares about a quarter of the world's total yet known, and Europe, the cradle of modern industrialism, contains much less than does Asia. Australia, Africa and South America have fared worst in this respect. But again, there is only a limited reserve of high-grade anthracite coal in the world. The great bulk of coal, especially in the U.S.A., is said to be low-rank bituminous, sub-bituminous and lignite.

¹ Stamp, *A Commercial Geography*, p. 119

² But see Case & Bergsmark, *College Geography*, p. 573 where it has been definitely stated that 'North America contains about 67 per cent of the world's total coal resources, and the United States contains more than half of the total known reserve.'

About 1,500 million tons of coal on the average are raised annually in all parts of the world. The great bulk of this huge quantity is bituminous, and only a little more than 60 million tons are of the best-grade anthracite, and about 120 million tons are lignite. One-third of the total coal raised is mined in the U.S.A., one-sixth in the U.K., and a little more than one-sixth in Germany. Thus these three countries together produce about two-thirds of the world's total. But although Germany exceeds the United Kingdom by 45 million tons or so annually, more than one-half of her total output of coal is lignite or brown coal. The entire output of the U.K., on the other hand, is bituminous; but neither the one nor the other seems to have reserves of

Coal
Production

Coal Production of the World.¹

Country	Type of Coal	Million tons	Total in million tons
U S A	} Bituminous	} 420	480
	} Anthracite	} 60	
Germany	} Bituminous	} 140	290
	} Lignite	} 150	
U. K.		245	245
France	"	55	55
Poland	"	40	40
Russia	"	38	38
Japan		35	35
Czechoslovakia	} Bituminous	} 15	35
	} Lignite	} 20	
Belgium	Bituminous	30	30
China	"	25	25
India	"	20	20
Netherlands	} Bituminous	} 12	18
	} Lignite	} 6	
Africa	Bituminous	15	15
Australia	"	6	6
Others	"	78	78
Total			1,410

¹Adapted from Case & Bergsma, *College Geography*, p. 573
The figures are only approximate as they have been compiled from a diagram.

high-grade anthracite. Of the huge production of the U S A—a trifle over 480 million tons a year—only one-eighth is anthracite, the rest bituminous

The total annual output during 1909-13 was 1,215 million tons, in 1912-25 it came down to 1,178 and subsequently in 1931-35 to 1,035 million tons

The important coalfields of the world are:—

I. The Appalachian or Pennsylvanian coalfield, which lies in the eastern part of the United States It is

The World Production of Coal¹

1909-13		1921-25		1931-35	
Country	p c	Country	p c	Country	p c.
U S A .	41	U S A .	47	U S A .	35
Gr Britain .	24	Gr. Britain ..	21	Gr Britain ..	21
Germany .	12	Germany .	10	Germany ..	11
France ..	4	France ..	4	Russia ..	7
Poland ..	4	Belgium ..	2	France ..	4
Belgium ..	2	Poland .	2	Poland ..	3
Russia ..	2	Russia ..	2	Belgium ..	2
<i>Rest of Europe</i> 4		<i>Rest of Europe</i> 1		<i>Rest of Europe</i> 6	
Japan .	1.75	Canada ..	2	Japan ..	3
Canada .	1.25	Japan ..	2	India ..	2
India .	1	India ..	2	<i>Rest of Asia</i> ..	3
Africa .	1	<i>Rest of Asia</i> 3		Canada ..	1
<i>Rest of World</i> 2		Africa .	1	Africa .	1
		Australia .	1	Australia .	1
Total 100		Total 100		Total 100	

¹ Adapted from Stamp The student will notice the divergences in the accounts put forward by different authorities What position, it may be asked, are we to assign to Germany regarding her annual output of coal? Even Stamp seems to contradict himself when he says that one-sixth of the world's coal output is raised by Germany. See *A Commercial Geography*, pp 119 and 122 Compare his statements with those of Case & Bergsmark

the largest coalfield of the world yet discovered. Although in reality one continuous field, it is worked in different parts and hence is commonly referred to in the plural. Taking all these parts together we find that this one field produces nearly three-fourths of the coal output of the U.S.A. The eastern half of the U.S.A. is really the great coal region of that vast territory, being dotted about by various other fields of lesser importance.

II. The Coalfields of Northern France and Belgium Europe. lie generally in a belt which extends from Great Britain through Northern France, Belgium, Holland, Germany and Poland and penetrate right into Russia. This affords a rather sharp contrast to the situation in Southern Europe which has few or no coalfields. But although these fields lie in a belt, they do not constitute one continuous stretch like the vast coal measures of the Appalachian field of the U.S.A. As has already been mentioned in a previous section, the coal seams of Britain and of much of the European continent are highly folded and broken and hence discontinuous. The coalfield of Northern France and Belgium is only a member of the northern group. It is the most important field of France and Belgium and both these countries owe much of their industrial development to it. But the coal obtained from this field is quite low-grade.

III The Campine Coalfield of Northern Belgium Europe and Holland lies, like that of Northern France and Belgium, within two territories. It affords a second source of coal to Belgium; but it is the only resource of that essential commodity to Holland.

IV. The Ruhr Coalfield which lies in the valley of Europe the Ruhr, a tributary to the Rhine, is the leading coalfield of Germany.

V. The Saar Coalfield lies on the borders of France and Germany.

VI. The Upper Silesian Coalfield is peculiarly situated; one part of it falls into Germany, another into Poland, and a third into Czechoslovakia

VII. The Donetz Field lies north-east of the Black Sea. It is one of the two leading coalfields of European Russia

VIII. The Moscow Field is the other leading coalfield of European Russia. But the coal is lignite

Besides these there are many smaller fields in Europe; of these the bituminous fields of Northern Spain and the Central Plateau of France are of first importance. There are important deposits of lignite as well as of bituminous coal here and there throughout Central Europe, especially in Germany (Köln, Saxony), Austria, Czechoslovakia, Hungary, Rumania and even in Italy, Yugoslavia and Bulgaria

There are vast stores of semi-bituminous coal in Canada towards the prairies of that country, besides some scattered measures of high-grade coal in the region of British Columbia. In Nova Scotia also fairly large deposits of good coal have been discovered.

In Asia, Japan is an important coal-mining country, and has small but fairly important fields, particularly in both the northern and southern fringes. And yet they are inadequate for her internal needs, for Japan is an industrial country rivalling Great Britain or Germany. Manchuria also possesses fairly good reserves of coal, and that is one reason why Japan evinces so much interest for her. The coalfields of China contain huge reserves, and some of her fields, unworked yet, may be as large as the Appalachian coalfield of

the U.S.A., particularly the one of Shansi and Shensi in the north, situated near the celebrated Great Wall of China. India is said to occupy the sixth place among the great coal-raising countries of the world. About 90 per cent. of her total output comes from the three provinces of Bengal, Bihar and Orissa. The most important of her coalfields is the one at Raniganj (Bengal) in the valley of the river Damodar about 120 miles from Calcutta. Other important centres are Jherria, Giridih, Rajmahal, Daltonganj and Talcher. The coal of Karanpura, Bokaro, Barakar, etc., are of low-grade. There are coal deposits of lesser importance in Makoom (Assam), Darjeeling (Bengal), Wardha (C.P.), Singareni (Hyderabad), Bikaner (Rajputana) and in the state of Rewa in Central India. Very small coal measures have also been discovered in Baluchistan and the Punjab. India does not export coal, except a small amount occasionally to Ceylon, Sumatra, Hong Kong, etc. Siberia contains important coal resources. The great Trans-Siberian Railway, which connects the coal measures of Vladivostok with those of the Moscow basin, actually passes through a number of important coalfields on the way; of these intermediate fields those of the Kuznetsk, Kansk, Irkutsk and Minusinsk basins fields, only partly explored yet, farther north, of these the coalfields of the Tungusk and Yakutia basins are perhaps the most important. There are various other fields of varying importance; but the one in the Pechora basin in the north and the other in the Fergliana basin in the south are well-worked and important. Other fields of Asia are usually small and the coals frequently of poor quality.

There is surprising divergence of opinion regarding Africa's share of coal resources. At one time it was supposed that the vast continent was very poor in this respect, and this belief persists even to this day with quite well-informed

men The Union of South Africa, however, has quite large deposits of coal. Rhodesia also has fairly important deposits. Quite recently, however, it has been discovered that Nigeria in West Africa possesses considerable resources of coal.

The most important coalfield of Australia is in Sydney. Another deposit of lignite is in Victoria. There is no coalfield in the North Island of New Zealand; but two small fields have been discovered on the western side of the South Island.

Throughout the entire continent of South America only one coalfield of small dimensions has yet been discovered in the south of Chile.

Coal is one of the most valuable factors in modern civilized life. In countless ways it is related to our daily lives. Its first and foremost use is as a fuel, and hence as a source of power. Railway trains for the most part are drawn by coal-burning engines, it is extensively used in steamships; many of the mills and plants are driven by the power generated by it. In fact, the leading producers of coal are also the leading industrial countries of the present-day world. Coke is produced by partially burning coal, and being harder than the latter it makes a hotter fire. That is why coke is largely used in the smelting of iron. The gases given off at the time of the production of coke are collected and used in the manufacture of coal-tar, dyes and various chemicals and drugs.

Although the United States is by far the biggest coal-producing country in the world, she does not generally export it; for she has had to consume nearly all of her production; and even if she at times exports a comparatively small amount, at others she also imports a small quantity.

In the export trade of coal, the United Kingdom easily leads. The situation of the coal-fields near the sea-board

helped the expansion of coal export trade. Actually coal forms nearly four-fifths of the bulk of outward cargoes from Great Britain. Coal forms the only bulky commodity for export from the country, which in the main has exports that are far less bulky than the raw materials and foodstuffs that are imported. By enabling ships that would otherwise go empty to carry a cargo, it has helped to reduce freights on inward cargoes and so has enabled the general population to get its food-stuffs and the manufacture to get their raw-materials at the lowest possible costs¹. The quantity and value of coal exported have decreased greatly since 1920 because of increase in production in many countries and the increased use of oil and electricity in place of coal. In 1933 the U.K. exported 32 million tons of coal. Other coal-exporting countries are Germany, South Africa, Poland, etc., etc.

Petroleum.—As has been mentioned in a previous chapter, petroleum or mineral oil occurs in the younger sedimentary rocks. Sometimes, however, it is found in comparatively old rocks which are not quite 'ancient' and are, of course, sedimentary or stratified. It is often called rock-oil, and in fact, that precisely is the meaning of the word petroleum (Latin *petra*=rock, *oleum*=oil). As the bodies of plants and animals begin to decay, hydrogen and carbon are given off. When these decay on the land surface, the gases mix up with the atmosphere. But in case this process of decay takes place under mud or sand beds, the released hydrocarbons, being unable to pass into the atmosphere in the gaseous state, are stored up. This decay, as well as the conversion of the organic matter into oil, takes place as the result of bacterial action. And as a rule, it is where the organic substances were deposited in brackish water, i.e.,

Sources

Origin.

¹ Buchanan—*Economic Geography of the Br. Empire*.

between fresh and salt waters, that the conversion of them into oil seems to have been possible. That is why mineral oil is largely found in old delta deposits. Gas, oil and salt are often found in association. As might be expected, the gas is at the top and salt at the bottom with the oil in between them. The necessary geological conditions for the storage of oil in nature are (a) a porous stratum of sandstone or shale to the oil, and (b) impervious layers both above and below to prevent the escape of oil. Like coalfields, these 'oil pools', or more precisely the beds of sand and clay, are folded by earthquakes, and although such movements are generally unfortunate for coalfields, they have ordinarily just the reverse effect on oil pools, for the beds which contain oil also contain water, and oil being lighter than water floats on the latter, and where, as a result of earthquakes, the beds are steeply inclined, the oil naturally rises to the crests of the arches.

Crude petroleum is a complex chemical substance, and varies greatly from one region to another in composition. These may, however, be roughly divided into two types (1) the oils with a paraffin base and (2) those with a base of petrol. Thus these two products are obtained from the crude oil by distillation. But petrol and paraffin do not exhaust the list of products obtained from the crude oil. Kerosene, gasoline, vaseline, benzine, asphaltum and other things are produced from crude petroleum. The use of kerosene as an illuminant is well-known. As late as the middle of the last century the chief source of illuminants was animal fat, despite the apparent preponderance of electric light kerosene still holds the first place as an illuminant even in America and Western Europe. Railway locomotives in some parts of the world, particularly in the U.S.A., are driven by the power generated by the burning

of kerosene. Some of the ships also use it instead of coal. It also provides the source of heat for millions of dwellings in Europe and America. The fact is that petroleum can be readily broken down into a number of fuels easily adaptable to the light combustion engine of motor cars, aeroplanes, and tractors, to the heavier Diesel engine of merchant ships, naval vessels and stationary engines, and the ordinary hot-water or hot-air furnaces used in heating buildings. And in most cases petroleum serves as a substitute for coal, it is cleaner and sometimes though not in all cases, less expensive than coal. And although more petroleum is now burnt for fuel than is used for any other purpose, it has been well said that "the whole development of our machine civilization has been made possible only by the use of petroleum lubricants." The lubricants manufactured from vegetable oils and animal fats could meet the needs of the slow-moving machinery of the pre-industrial age; but the high-speed and high-temperature machines of to-day quickly decompose these vegetable and animal oils, and only the lubricants of mineral oils are suited to them.

The relative importance of the principal producers may be studied from the following table:

The Leading Producers of Petroleum¹

1921-25			1931-35		
Country		p.c.	Country		p.c.
U. S. A.	..	65	U. S. A.	..	59
Mexico	..	10	U. S. S. R.	..	12
U. S. S. R.	..	5	Venezuela	..	8
Persia	..	4	Romania	..	4
Romania	..	2.5	Iran	..	3
Dutch East Indies	..	2.5	Dutch E. Indies	..	3
Others	..	7	Mexico	..	2
			Others	..	9
Total 100			Total 100		

¹ Adapted from Stamp.

From all these figures we find that the U. S. A. is by far the most important producer of petroleum with a steady output of nearly two-thirds of the world's total. Of the huge output of the U. S. A. about 70 p.c. comes from the three states of Oklahoma (25%), California (24%) and Texas (21%), other important centres of production in the republic are, in order, Kansas, Louisiana, Wyoming, Illinois and Kentucky. At one time Mexico was one of the first-rank producers; in 1923 she held the second place in respect of petroleum production with 29 per cent. of the world's total. But she has fallen far behind now. South America, so very deficient in coal resources, holds an important place in respect of oil production. Especially important is the output of Venezuela, which has her chief oil centre near about the Gulf of Maracaibo. Other important oilfields of South America are in Colombia, Ecuador, Peru, Trinidad (Br.), and the Argentine. Canada in North America is not yet known to have any very important oilfield, although she is by no means devoid of small oil pools, and in recent years she has been steadily increasing her output.

Europe as a whole is rather deficient in mineral oil resources. Her only important oil centres are in Rumania and Poland, and although the total output of Rumania is nothing like that of Mexico or of Venezuela in their heyday, she certainly has a place among the leading oil-producers of the world. Poland, however, is not so fortunate despite her fairly abundant resources. There are, however, lesser oil pools in Germany in Hanover, and France produces a little oil from her oil pools at Pechelbronn. Of all the European countries Russia is by far the richest in oil resources. There are big oilfields on both sides of the Caucasus chain, especially in Grozny and Baku. Recently, again, another chain of new oilfields, running parallel to the Ural Mountains, has

been discovered. These newly discovered fields do not, strictly technically, belong to Asia, because they occur, at least for the most part, on the European (Western) side of the Urals

In Asia the oilfields of Iran (Persia) are thought to be 'enormously important'. Quite near these there are the newly developed fields of Iraq, and still more recently there has been discovered an oilfield on the southern shores of the Persian Gulf, this was discovered only in 1935. From these oilfields of what the westerners call the Near East we are to proceed eastward till we reach the small oil pools of the Punjab, again travelling farther east we come to the oilfields of Assam. Proceeding still farther we reach the important

Asia.

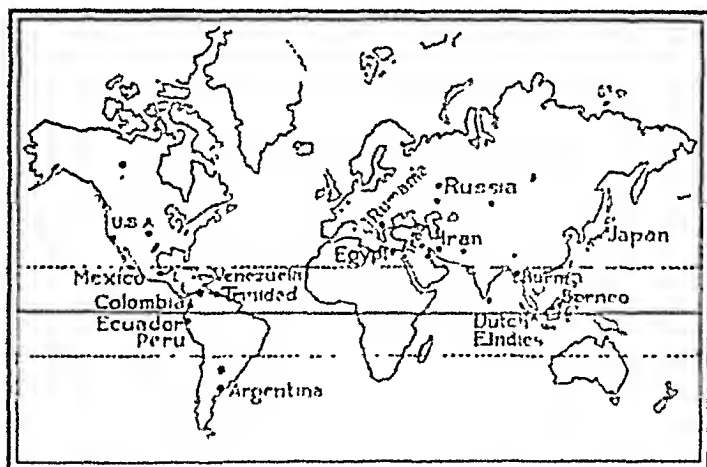
Persia and

Iraq

India

Punjab and

Assam



WORLD PRODUCTION OF PETROLEUM

fields of Burma. We have been travelling from Iran in a general south-easterly direction, from Digboi, Assam, we take a more decidedly southerly turn onward while keeping all the time towards the east, and thus we reach the oilfields

of Java, Sumatra and Borneo in the Dutch East Indies. Borneo is, however, partly Dutch and partly British. By the time we reach Borneo our direction has changed northwards, and proceeding along that direction we come to the oilfields of Japan. These are not so big as those of Burma or the Dutch East Indies, and the small output of Japan is quite insufficient for her home requirements.

As the map of petroleum production shows, Africa's share of oil is quite insufficient. That huge continent has only a few small fields on the shores of the Red Sea in Egypt. But the continent of Australia is even more unfortunate; no oilfield has yet been discovered there.

The world production of petroleum increased rapidly from 1912 to 1929 and since then the average annual production has been somewhat steady owing to an agreement to restrict output among the principal producers.

World Production of Oil

(In million barrels)

1912	..	..	.	366
1918	.	.	.	502
1923	..	..	.	1,120
1928	.	.	.	1,325
1929		..	..	1,489
1933	.	.		1,385
1935	.		.	1,572

In 1936 the total production of petroleum reached 1730 million barrels (7 barrels=one ton), and in 1937 it rose to be 1960 million. This is an 'alarming rate' of increase. It is not possible to calculate the world's oil reserves. Many of the great oilfields have been remarkably short-lived, particularly in America, having reached their maximum output in two or three years of their discovery and then

declining quickly. Thus the world depends largely upon the continued discovery of new fields for its huge requirements of petroleum. And although the exhaustion of the world's oil reserves is by no means imminent, geologists are fairly well agreed that the exhaustion will come long before any shortage of coal occurs,—indeed it would be no surprise if the production of oil shows a marked decline within a few decades. All countries are at present practising a restriction on their output, and many of the countries are trying to produce oil on the present scale by the hydrogenation of coal, i.e., by producing oil from coal. The process in theory is simple; it consists in forcing hydrogen gas at high pressure to mix up with one of the constituents of coal and thereby effecting a change in the solid coal by way of its liquefaction into oil. Another way known as low-pressure carbonisation is to convert coal partly into coalite, a kind of smokeless fuel, and partly into oil. Still there are other methods of producing petroleum. One of these is to extract oil from oil shale. This is possible because oil shale contains some amount of oil in the form of minute globules. The shale is heated in a closed vessel usually of glass with long downward-bent neck called a retort, and the oil globules are converted into gas which, when collected and cooled, condenses to be reconverted into oil. But all these processes are as yet more or less expensive, and do not generally pay, the oil obtained from wells is much cheaper. Moreover, it has been calculated by experts that "to produce oil on the present scale by the hydrogenation of coal would mean increasing coal production by about 50 per cent. and would involve immense capital investment. Therefore, oil will be produced mainly from wells until scarcity forces reliance on higher cost alternatives."¹

Artificial
Petroleum.

¹C. K. Leith, *World Minerals and World Politics*, p. 33.

The irregular distribution of the world's oil cannot but have its effects on world politics and on the national economy of individual nations. The British Empire, a cursory glance at the map will reveal, is as a whole deficient in oil resources when judged by modern standards of oil consumption. The whole Empire produces only about 3 per cent. of the world's total supply, and the bulk of this small output comes from the three leading oil centres of the Empire—Trinidad, Burma and the British occupied parts of Borneo. But this gloomy prospect is balanced to some extent by the fact that a great proportion of the world's oil is now controlled either by American or by British companies.

It is also significant that the U. S. A., despite her enormous output, can spare but little for export. Her production and consumption of oil are very nearly on a par, and actually she does import a considerable amount of crude oil. But this is not so much for home consumption as for the purpose of exporting the oil to other countries after refinement. The general custom hitherto was to export oil from the producing countries to the consuming countries, and the latter used to refine the crude oil before re-exporting a part of it to different places including the country of origin. At present, however, there is keen rivalry between the producing and the consuming countries as to which shall do the refining, and so in some countries they have set up refineries at the exporting ports and in others at the importing ports.

Natural Gas.—Natural gas, like petroleum, is of organic origin, and is, therefore, found associated with the latter. In the early days of the oil industry little heed was paid to this valuable product of nature, and enormous quantities have thus been allowed to waste. The gas underground is often under great pressure, and any faulty method of drilling is liable to release the gas which then gushes forth with

mad violence. Even in the exploitation of an oil well it is essential to keep the gas underground; for it exerts pressure and forces the oil up the well. The gas is generally collected by means of pipelines, and because of the natural pressure it can be easily forced to distant markets. A pressure of anything between 450 pounds to 2,000 pounds is not uncommon.

Natural gas is a perfect fuel, and can, therefore, be harnessed in the service of the various manufacturing industries. At present it is largely used in the glass and the iron and steel industries, besides being used extensively as an illuminant. It seems to be a formidable rival of coal, and may, in near future, set up a great revolution in the coal trade. But again, a steady supply of natural gas on a large scale, like that of petroleum, seems to be only temporary, and certainly the length of life of any given gas field is problematical. At present, however, much more of natural gas is converted into gasoline than is used in the natural form.

The U. S. A. is naturally the leading producer of natural gas. She is also the chief consumer. In that country there are more than 55,000 gas wells and above 165,000 miles of pipelines for its distribution. The exploitation of natural gas on an extensive scale is, however, a very recent affair; but the industry has been expanding by leaps and bounds since 1921. Other important producers are Russia, Italy, Canada, the United Kingdom and Hungary.

Water-power.—The conversion of falling water into mechanical energy is one of the earliest achievements of man. It might not have been older than the utilisation of the force of the wind for mechanical purposes; but curiously enough wind-mills are a rarity to-day, whereas the force of the falling water is still being employed fairly extensively in spite of the growing competition of coal and petroleum. When the steam-engine had not yet been invented, water-power

Uses

Production.

Water-power vs. Wind-power, coal and oil.

very nearly pervaded the entire field of the manufacturing industries

Water-power is now utilized more in the form of electrical energy than as a mechanical agency pure and simple, and this energy can now be transmitted easily to a distance of 300 miles from its base. The extreme limits to which it can be transported have, however, been calculated at 400 to 600 miles overland. Thus it is an actuality to-day to *export* water-power like any other commodity, although we cannot yet export it over vast stretches of water. New Zealand, for example, cannot at present export her surplus water-power over the sea to Australia, while water-power is now frequently transmitted overland from its source in the U. S. A. The electric turbine, again, renders it possible to utilize the entire energy derived from even the mightiest falls. Moreover, water-power is capable of being much more widely distributed than either coal or oil. Flowing water is very nearly an inexhaustible source of power, whereas coal and oil, though abundant, are strictly limited. Electricity can be derived from steam as well as flowing water. The relative importance of steam-electric and hydro-electric energy varies in different regions; countries with abundant fuel resources find it easier to make use of the former, while in regions rich in rapids and falls but poor in fuel it is easier to make use of the latter. Thus in Northern Germany, where coal is fairly abundant, steam is the major source of electric energy; but in Norway, where there is a scarcity of fuel, falling water is practically the only source of electric energy. In the U. S. A. about one-third of the total electric energy is derived from falling water.

Of all the continents Africa ranks first so far as her potential water-power resources are concerned, it has been estimated that she possesses about 190 millions of horse-

power, approximating 40 p.c. of the world's total. To employ this huge power is to derive a benefit from the employment of about 1,330 million men, since the power of an ordinary man is supposed to be one-seventh horse-power. But Africa is the most backward of all the continents so far as the exploitation of her potential power resources is concerned. The total actually employed falls far short of even two million horse-power. No device has yet been invented for the carrying off of this tremendous power to other continents in order to add to the wealth of the great industrial nations of the earth. The development of these vast water-power reserves of Africa even for the promotion of home industries will, in all probability, take generations. In some not very remote age, however, part of this energy will perhaps be utilized for cooling the homes within the humid lands of Equatorial Africa, just as fuel has been used for centuries on end to heat the homes in the middle and higher latitudes. It will also be used on a large scale for mining and agricultural purposes. Thus Africa seems to have very great possibilities in the future, and this enables us to understand, to some extent at least, the rivalry of the Western nations for the possession of this 'Dark Continent'. Asia comes next to Africa in her potential water-power resources, with a total of about 75 millions of horse-power. But her developed power scarcely exceeds 5 millions of horse-power, although she contains nearly a third of the land area of the earth and supports more than half the total population of the world. The total turbine installation of Asia is less than that of Norway or Italy. North America is a close rival of Asia so far as potential power reserves of the two continents are concerned; but she ranks first in point of actual development of these resources, with a total well exceeding 20 millions of horse-power. Yet it cannot be said that the

(2) Asia.

(3) North America

turbine installations in North America are uniformly distributed all over the continent. The fourth place in potential power reserves is occupied by Europe, with a total just short of 60 million horse-power. In point of actual development her figure is just short of 20 millions of horse-power. Thus North America and Europe together share more than 95 per cent. of the world's total output of hydro-electric power, of which the U. S. A. and Canada account for nearly half. Next comes South America with a total reserve considerably above 40 millions of horse-power; but her actual output is between 2 and 3 millions of horse-power,—a figure that gives her the fourth place in this respect. Last of all comes Oceania with a total reserve of about 18 million horse-power, and, though her actual output of energy does not exceed 2 millions of horse-power, she may be given the fifth place (the sixth place being occupied by Africa) in this respect. To sum up, the countries which have developed their water-power resources are the U. S. A., Canada, Italy, Japan, France, Switzerland, Germany, Sweden, Norway, Spain, Australia (particularly Tasmania), and New Zealand. It is fairly accurate a generalisation to say that, hilly and mountainous regions, especially those where rainfall is constant or abundant, possess large amount of potential water-power resources, and that since coal and oil are not found in very mountainous tracts, such countries have generally been obliged to develop their water-power resources for industrial purposes. The British Isles as a whole is rather poor in water-power reserves and most of her electricity is derived from the use of coal, although water-power is utilized in the Highlands, the southern uplands of Scotland and Wales; the Irish Free State, where there is a great scarcity of coal, has, however, the largest hydro-electric installations in the British Isles near Limerick on the River Shannon.

Tasmania and New Zealand are making use of their water-power reserves at a very high pace, and as late as in 1935 a start was made to utilize the famous Victoria Falls of Africa.

STUDIES AND QUESTIONS

1. Make a list of the principal materials used as fuel. What is the chief fuel in your locality and why? Where does coal and petroleum used in your locality or your vicinity come from?

2. What are the leading countries in (a) coal reserves, (b) coal production and (c) coal export? Account for your answers.

3. Briefly describe the world distribution of coal with special reference to its economic importance. (I. P. S. '32)

4. In what conditions may a coal mine be of greater value than a gold mine? Illustrate your answer by reference to the coal mines of Great Britain and Germany. (C. U. Inter. '27)

5. Name the countries from which coal and petroleum are exported. (B. Com. '24).

6. Give an account of the world distribution and present production of mineral oil. (Inter. '40).

7. What are the leading countries in (a) petroleum reserves, (b) petroleum production, and (c) petroleum export? Account for your statements.

8. What are the liquid fuel producing countries? (B. Com. '40)

9. Examine and estimate the coal and petroleum resources of the U. S. A. (Inter. '32)

10. What are the essential geographical factors for the development of water-power? Give suitable examples from particular countries.

11. Name any four countries where water-power is principally used. Explain the special circumstances in each country favouring its use in preference to other forms of power. (Inter. '33)

12. Examine and estimate the water-power resources of Africa.

13 Discuss the nature of (a) supply of, (b) demand for, natural petroleum in the continent of Europe during (a) normal times, (b) a war. What is the share of substitute products in the total consumption of this fuel and from what are these obtained? (C U. B Com '41).

14. Describe briefly the distribution of mineral oil outside the U S A (C U. Inter '43).

CHAPTER VII

THE EXCHANGE OF COMMODITIES

Transport.—The basic geographical fact underlying the entire commercial superstructure of the world is that different climatic or natural regions yield different kinds of product, or provide the same products 'under unequally favourable conditions'. This, we have seen, results in two more or less opposed tendencies of commerce: the first, which relates primarily to production, is to increase the variety as well as the quantity of products in a particular region; the second, relating likewise to the exchange of advantages for obtaining a particular commodity in different regions. This latter tendency is naturally bound up with transport facilities for its proper development¹ Transport of commodities may, therefore, be regarded as a fundamental feature of commerce, and with it may also be considered the transport of human beings, which is not only an indispensable factor of commercial development, but also a fundamental feature of life itself.²

The influence of transportation on the expansion of the commercial world can hardly be overstated. It has acted as a *fillip to production*. Several commodities formerly considered luxuries are now regarded as necessities in the daily lives of men and women all over the civilized world. In the past people lived mainly unto themselves; they produced their own food and clothing and manufactured their own implements, and thus strove, as far as was practicable, to be

Transport
against the
background
of commerce

Its influence
on com-
merce.

(1) En-
hancement
of pro-
duction.

¹ Chisholm's *Handbook*, p. 1.

² *Op. cit.*, p. 77.

self-sufficient within their respective communities. In many cases, however, such articles could be made more economically elsewhere; but there scarcely existed any efficient and cheap system of transportation to facilitate economical production and distribution. Consequently nothing like the geographical division of labour we see to-day was then in evidence. With the development of modern forms of transportation it has now been possible to deliver the necessary raw materials cheaply and easily at the plants for production, and the finished products can also be as easily and cheaply distributed to the consumers abroad. Transportation has thus favoured the *geographical division of labour*. Thus in our own country, which is by no means commercially much advanced, cotton growing has developed mostly in the south-central regions, jute growing in Bengal and the neighbouring parts of Bihar, Assam, and Orissa, tea production in Assam, Northern Bengal and the Nilgiris. In the U. S. A., admittedly a most progressive commercial country in the world, cotton growing developed in the south, the citrus fruit industry in the Mediterranean regions of California and Florida, wheat production in the Great Plains and the Spring Wheat Belt. This geographical division of labour, given proper scope, naturally leads to *commercial co-operation and co-ordination* among different peoples. This is particularly the case in countries following some sort of planned economy under state direction as in the U.S.S.R. But even in capitalist countries large-scale trade and commerce cannot proceed without a measure of willing co-operation among the traders or without some sort of co-ordination of the various industries. In Great Britain, for example, there has been of late years a rapid development of the system of linking up several big businesses into a single group following a common policy. The interstate trade of

the U.S.A. flows freely from state to state without being hampered in its operations by high tariff walls like the international trade of Europe. And whatever be the ultimate drawbacks of the method of 'rationalisation' of industries, or of the consumers' co-operative movement, these are aimed, among other things, at commercial co-operation and co-ordination in one way or another.¹

Judged from the economic viewpoint, transportation is a part of production. For the latter consists in producing or creating, not material things, but utilities, that is to say, production consists in making matter useful for consumption, in imparting to it the ability to satisfy wants. To do this two things are essential: matter must be given form or qualities suitable to satisfy some want, and the article or commodity thus produced must be taken to the user. Agriculture, manufacture and the various industries by which things are grown and shaped impart to matter the form and intrinsic qualities which make it useful. Methods of transportation bring the commodity to the place where it can be used. The usefulness of a thing depends not only on the intrinsic utilities of form or quality, but also on its location—its 'place utilities'. These 'place utilities' are created by the transportation services. Transportation is thus a part of the general process of production.²

Nature of
Trans-
portation.

Trans-
portation as
part of
production;
it creates
place
utilities

Transportation also helps increase the rent or income derived from the land or other natural resources. Such

¹ But it must not be forgotten that the co-operation and co-ordination spoken of above are not accomplished facts, but merely general tendencies. They cannot function but as mere tendencies in an essentially competitive system of commerce, if they function at all. Geographical division of labour, again, may, and often actually does, lead to the exploitation of one country by another.

² E. R. Johnson & T. W. Van Metre, *Principles of Railway Transportation*, p. 3

rent or income depends upon two primary factors—the productivity or intrinsic characteristic of the land or resources of nature, and their location. It is with respect to location that transportation is of such importance¹

A study of the important cities of the world will clearly reveal the importance of transport facilities to urban development. Most of these cities are located on marginal positions between land and sea or inland waterways or land routes, and are, therefore, easily accessible from various parts of the country. Delhi, for example, is situated in the heart of the great Indo-Gangetic plain; from it radiate vast routes to different parts of the Indian subcontinent, and its occupation means easy access to various parts of the country. Calcutta, located on the Hooghly (Ganges), not far from the sea, and connected by railways with all parts of India, has become one of the largest ports of the world. London, New York, Paris, Tokyo, Berlin, Chicago, Shanghai, Buenos Aires, Moscow, Philadelphia, Osaka, Vienna and most of the other leading urban centres of the world hold similar strategic positions and owe much of their development to transport facilities.

Modes of Transportation.—The modes of transportation are not the same throughout the world. These have been classified by Stamp into seven categories²:—

1. Human portorage, including the wheel-barrow and like devices
2. Animals, used (a) as beasts of burden and (b) for draught purposes.
3. Roads, and motor cars, lorries, &c.
4. Railways, including (a) railways proper and (b) tramways &c.

¹ *Op. cit.*, p. 5.

² Chisholm's *Handbook*, pp. 77 sq.

5. Inland waterways—rivers and canals.
6. Ocean transport.
7. Air transport

1. Human portorage.—More than half of the world's population still depend upon human energy as the major motive power in the local transportation of goods. This has been attributed to various causes—political, social and industrial backwardness, economic disabilities, density of population, relief and climate and so on. It is, for example, exceedingly difficult to build and maintain modern roads within the vast tropical forests, in some parts of south-eastern Asia and particularly in China, human labour is cheaper than animal labour, because there is not only a scarcity of beasts of burden in these regions, but "every inch of the land (in Northern China) is so precious that the narrowest possible roads are used, such as will accommodate a wheel-barrow but not a two-or four-wheeled cart." In parts of the East African uplands the tsetse fly makes animal transportation impossible, and so man is there the chief carrier. An idea of the prodigious labour expended by the 'coolies' in China may be obtained from the fact that "in the tea traffic between south-west China and Tibet .. the normal load per man is 200 lbs., and two mountain passes more than 7,000 feet above the level of the starting-place have to be scaled, with about 120 miles to be covered in some twenty days."¹ The average carrying capacity of an Asiatic or African porter is, however, said to range between 55 and 56 lbs.; when handling a wheel-barrow it ordinarily mounts up to 250 lbs.²

Its importance and causes thereof.

Case of S. E. Asia and E. Africa.

Man's carrying capacity.

2. Animals.—Where beasts of burden are abundant and the environmental conditions are unfavourable for the

Their use.

¹ Chisholm's *Handbook*, p. 77.

² Case & Bergsmark, *College Geography*, p. 646.

mechanization of overland transport, animals have largely replaced man as carriers. Even so, animal transport is still of great importance in the most mechanized countries of the West, especially in the rural districts, although mechanization of transport is tending more and more to displace it. In most of the European countries the horse is the most useful animal for draught purposes; but the ox is said to be more important in central and eastern Europe. In southern Europe, particularly in the Mediterranean regions, the ass is the most useful of all animals; he can live better on scanty herbage than the horse. In the mountainous parts of southern Europe, however, the mule is the best animal because of its sure-footedness and endurance. In Asia and central Africa the ox is preferred to all other draught animals and beasts of burden, in Asia the buffalo comes next. Neither in Asia nor in Africa the horse is a first-rate domestic animal. Reindeer are practically the only draught animals in northern Asia, Europe and North America, they are celebrated for drawing sledges over the snow-covered ground. The Esquimaux use the dog for the same purpose. The celebrated yak, a unique species of ox, characterized by long silky hair, takes the place of the mule in the mountainous parts of Central Asia; goats and sheep are also sometimes used in these regions, and goat-carts are not unknown in the Alpine region of Europe. The llama is the most important beast of burden in the Andes of South America. The elephant is largely employed in south-eastern Asia—in India, Burma, Siam, Ceylon, Sumatra, Borneo, etc. In Africa they have ceased to train up elephants for labour. In India the government supervise over the catching of elephants for training. Amidst forest and marsh which cannot be traversed by any other domesticated animal, the lordly elephant is quite indispensable to man. In desert and

semi-desert regions, again, the camel is even more indispensable than the elephant in the forest and marsh. No other animal carries so much merchandise than does the camel. The early colonists introduced this useful animal into Australia; but since motor-cars have been replacing him even from his old home, he has now been completely ousted from his adopted country. Animals are used both for carrying loads and drawing carts. Broadly speaking, one animal can pull at least four times the load it can carry. As for the horse it has been estimated that one capable of carrying 30 lbs., can draw a wagon load above 1 ton over a hard-surface road and the drawing capacity of a team of horses over a compacted, snow-covered surface is from 8 to 10 tons.¹ The use of wheeled vehicles, however, involves generally the making of suitable roads.

Carrying capacity of animals.

3. Roads.—Road construction nicely illustrates the correlation between and interdependence of the arts of road-making and transportation. Road-making was, until comparatively recent times, dependent upon the local supply of raw materials for construction. With the development of transportation this state of affairs has ceased; road materials are now brought from distant sources. On the other hand, transportation has always been dependent on good roads. Until comparatively recent times most of the roads in clay areas were difficult for dust in the dry season and for mud when rains would set in. This is still the case in many parts of the world such as western Siberia, the plains of Hungary, Australia and the Argentine. Almost simultaneously with the overwhelming transformation of the system of transportation within the last 150 years, the art of road-making has also been revolutionized. Two Scotsmen, Telford and Macadam, were particularly responsible for this amazing change. Tel-

A question of interdependence.

Roads in 'clay areas'

¹ Case & Bergsmark, *College Geography*, pp. 645-46

ford first conceived the idea of laying a solid stone foundation for roads and covering it with a layer of small broken stones; this upper layer was made thicker in the middle so as to impart a slightly arched form to the road like the camber of a beam; on each side of the road were provided adequate ditches for drainage. Macadam simplified the method by ignoring the costly stone foundation altogether. He began constructing roads by means of broken stones of uniform size, each piece an inch or two in diameter, and cambering the roads better for drainage. But with the advent of the automobile even this proved inadequate; for the rapidly moving wheels provided with rubber tyres began to disintegrate the road materials by uplifting stones and scattering away the finer particles of dust which formed a natural cement. Then was invented the use of concrete and 'tarmacadam' (broken stones coated with tar). Of the several varieties of stone used in road-making limestones and close-grained igneous rocks like basalt are said to be the most suitable. Granite being coarse-grained, its large crystals tend to crack under heavy pressure; but roads made of such stones are more suitable for horse traffic than for automobiles. Gravel is often used, particularly on the surface. Another common road material is blast-furnace slag. Most up-to-date roads are admittedly unsuitable for horse traffic because of their smoothness: they are essentially motor roads. It is, therefore, quite probable, as Stamp suggests, that in cities horse traffic will, in near future, be greatly restricted, if not prohibited altogether. Motor cars, motor lorries etc., are now being used in the deserts of Sahara, Arabia, Australia and other regions instead of camels. This has revolutionized desert transport to a large extent.

Road mileage of different countries may be studied from the following table.

Road Milence in 1930¹

U.S.A.	..	..	..	3,016,000 miles
Russia	..	..	..	776,700 ..
Japan	..	..	..	575,300 ..
France	.	..	..	390,400 ..
Canada	..	..	..	388,350 ..
Australia	..	..	..	350,000 ..
India	..	..	..	300,000 ..
Germany	.	..	..	200,000 ..
U.K	..	..	..	175,000 ..
Poland	..	.	..	150,000 ..

The total mileage of the world's highways, as computed in 1930, is said to be some 7,800,000 miles, or about ten times that of double-track railways. Of this total the United States alone (excluding Alaska and other territories) possesses 38·7 per cent., and Russia which ranks second has only 10 per cent. But it is only fair to compare road mileage of a country in proportion to its area and population; the quality of the roads is also to be taken into account in such comparisons. Thus comparing, we find that Japan leads the world with 3 miles of road to the square mile. The U.S.A. occupies the twelfth place in this respect with 1 mile of road per square mile. Other countries laying a claim to such distinction are Luxemburg, Northern Ireland, United Kingdom, Denmark, France, the Irish Free State and Belgium. The U.S.A., however, ranks first as the country possessing the greatest mileage of unimproved roads; in this Japan comes next. But the U.S.A. leads also in possessing the greatest mileage of improved roads without even a close second; for Italy, which ranks second in this respect with her 3,700 miles of bituminous macadam (penetration macadam) roads.

¹ Compiled from Case & Berryman, *College Geography*, p. 664

challenges no comparison with the 30,000 miles of such roads possessed by the U.S.A. The United States leads also in asphaltic or bituminous concrete roads with a total mileage of 9,000, while Canada comes next in this respect with a total mileage of only 900. Of a total mileage of 300,000 or a little more shared by India, only 75,000 miles are motorable.

The development of modern roads has been greatly stimulated by the growth of motor traffic. In 1934 there were in the U.S.A. more than 25,000,000 motor vehicles *i.e.*, roughly one for every 4.5 persons. In Great Britain in the same year there were some 2,500,000, *i.e.*, one for every 20 persons. The U.S.A. alone possesses half the world's total number of motor vehicles, she has not only the largest number of cars and trucks, but also the largest number of cars in proportion to population. It is significant that in some of the sparsely populated countries like Canada, Australia and the Argentine the automobile plays a much more important part than in many of the European countries. The motor-omnibus has played an important part in the spreading of intercourse between urban and rural areas, and motor vehicles are now competing more and more with trams and railway trains. It has been predicted by many that in future motor vehicles will oust railway locomotives and trains altogether. But modern roads are still supplementary to the railways, acting primarily as feeders to the latter; even in spite of the existence of trans-continental highways in the U.S.A., roads still act in that way. The fact is that motor traffic is cheap and more mobile than railway traffic, and is much better for short distance transportation.

4. **Railways.**—The influence of topography on the construction of railway routes is much more obvious than on that of motor roads. The railway-builder's problem is

said to lie 'midway between those of the road engineer and the canal builder'. Railway locomotives are incapable of ascending steep slopes; an ordinary locomotive hauling more than its own weight on a gradient of 1:20 fails to work at all, and working becomes difficult if gradients of about 1:100 are frequently encountered. It has been found that the cost of running a given train-load over a mile of track on a gradient of 1:50 is double that of running it over a mile on the level. But trains can somehow be worked on gradients of 1:22. These are the reasons why railways do not generally run parallel to roads already constructed for the same destination. The railroad from Siliguri (Bengal) to Darjeeling has been constructed as a spiral line in order to lessen the gradient of the roadbed; that from Bombay to the Deccan plateau follows a course of a series of zigzags for the same reason. In the hill section of the Assam Bengal Railway the lines have been pierced through the mountains in a number of tunnels. Various novel types of railways have also been invented for running in mountainous regions. Wide stretches of water also often interfere with the construction of railways. These are mostly bridged over; in some cases, again, tram-ferries are used for the transfer of whole trains across the intervening water. The train-ferry system has long been in existence over the channel lying between Denmark and Sweden; such communication has also been established between England and the continent *via* Harwich for ferrying goods trains across, and in 1936 the first passenger train from London was thus transferred to Paris *via* Dover-Dunkerque.

Railways in mountainous regions

Tram-ferry system

Some Important Trans-Continental Railways

1. The Trans-Siberian Railway, connecting Russia with the Far East. The original line runs from Vladivostok

on the Pacific coast to Chelyabinsk in the west. It now connects Moscow and Leningrad with Vladivostok, Dairen, Peiping and Tientsin. The whole line is now a double-track system. With the completion of the Hankow-Canton Railway in 1936 it has now been possible (?) to travel from Calais to Canton by railway.

2. The Trans-Caspian Railway, connecting Central Asia with European Russia. It runs from Krasnovodsk on the eastern shore of the Caspian Sea to the heart of Turkestan, so important for cotton-growing, and thence to Moscow *via* Tashkent. It also throws off a branch towards the Afghan frontier from Merv to Kusk.

3. The Orient Express Route runs from Paris to Istanbul (Constantinople), connecting Munich, Linz, Vienna, Bratislava, Budapest, Belgrade, etc. The '*Baghdad Railway*' was destined to connect Baghdad by Mosul with Berlin; at present it runs from Konya on the west to Nisibin on the east, throwing off a branch to Alexandretta and another to Damascus, whence one line runs to Mecca, and a second, crossing the Suez Canal at El Kantara, proceeds to the Nile valley.

4. The Cape-to-Cairo Route was destined to connect South Africa with Egypt; the scheme was outlined by Cecil Rhodes; but it could not be worked out. At present one may go to Khartum from the Cape by railways and roads. Khartum is connected by rail with Wadi Haifa, whence one is to reach Shellal by river. From Shellal a train runs to Cairo.

5. The Canadian Pacific Railway connects the Pacific sea-board of Canada with the Atlantic sea-board. It runs from Halifax and St. John on the east to Vancouver

on the west, connecting Quebec, Ottawa, Montreal, Winnipeg, Regina, etc., on the way. It is the shortest of the trans-continental lines of North America.

6. The Canadian National Railways, formed by the amalgamation of the Canadian Northern, Grand Trunk, and Grand Trunk Pacific Railways, run across the North American continent partly through Canada and partly through the United States, connecting various important centres like Prince Rupert, Portland, Moncton, Winnipeg, Quebec, Chicago, Buffalo, etc.

7. The Union and Central Pacific Railroad, the first trans-continental system north of the Isthmus of Panama, connects Chicago (and, of course, New York) with San Francisco. It lies entirely within the U.S.A.

8. Western Pacific Railroad, also in the U.S.A., is another trans-continental system opened for freight traffic only. It is much longer than the Union and Central Pacific.

9. The Northern Pacific Railway runs from St. Paul some 400 miles north-west of Chicago, to Tacoma on Puget Sound and Portland; it has connections with New York and Philadelphia as well.

10. The Great Northern Railway also has St. Paul for its eastern terminus and runs to Seattle on Puget Sound; it, too, has connections with New York and other important centres.

11. The Southern Pacific Railway, runs from San Francisco to Washington and New York through the southern states of the U.S.A., throwing off branches towards Mexico.

12. Atchison, Topeka and Santa Fe Railway has established connections between New York and San Francisco by way of St. Louis. Like the Southern Pacific

it also passes through the southern half of the Valley of California

13. **The Chile-Argentine Railway** connects Buenos-Aires with Valparaiso. It is the most important of the four trans-continental railways of South America

The development of **Tramways** began in the last quarter of the nineteenth century. The early tram-cars were mostly horse-drawn vehicles, the use of electric power came later on. At present tramway companies are finding it hard to compete with 'the more flexible motor-omnibuses'. In some countries 'trolley buses' are being used instead of tram-cars; these are driven by electricity, but require no rails. The large number of privately owned motor-cars have rendered the street-car system very nearly useless in America.

5. **Inland Water Transport.**—The use of inland waterways given by Nature has been known to man since the dawn of history. Even the construction of artificial waterways was not unknown in pre-Christian times. Yet water carriage has been revolutionized only within the last hundred years or so; it began with the introduction of the steamboat in the early years of the last century.

15. In some countries water carriage is much more important than land carriage. The large navigable rivers of the East have always provided splendid means of access to inland regions, and many canals have been cut from them both for irrigation and transport. The intricate network of canals in China would, if spread along in a continuous line, coil round the entire globe seven or eight times. This, coupled with the fact that the earliest civilizations almost invariably flourished in one or other of the large river valleys of the East, has led many to suppose that water carriage is

more advantageous than land carriage. It is certainly cheaper, because large navigable rivers and lakes provide ready-made highways that cost little to maintain. But this is not true even of all kinds of waterways provided by Nature: not only canals but canalized rivers also cost a good deal.¹ Water carriage is, moreover, slow and uncertain. Many of the rivers are, again, useless for navigation, and even good navigable rivers mostly flow for long stretches through marshy regions devoid of landing places. Rapids and falls are almost insurmountable barriers to navigation; rivers which are subject to great variations in level, as most of them actually are, do not offer good transport facilities all the year round. In wintry regions, again, the stoppage of river traffic through ice in winter is the rule rather than the exception. Thus nearly all the rivers of Peninsular India become unnavigable in the dry season on account of low water and inadequate draft. Of the three great rivers of China only the Yangtze Kiang is ideal for navigation; the Hwang-ho is too rapid, too shifting and too much obstructed by shallows, and the Si Kiang, though navigable for a long distance from its mouth, has several rapids to impede navigation. The great Mississippi of North America flows for miles at long stretches without landing places. The mouths of the rivers of Siberia, flowing towards the Arctic seas, remain icebound in winter. All these considerations inevitably suggest the superiority of railways to inland

¹ It is often rather erroneously assumed by many that inland water transportation costs less than railway transportation. But when cost of construction and maintenance of canals and canalized rivers are taken into account, the reverse appears to be correct. In the U.S.A. inland water transportation has been found to cost 40 p.c. more on the average than railway transportation. The story is much the same about inland transportation in Europe as well. See H. G. Moulton, "Economic Aspects of Inland Water Transportation," *American Journal of Geography*, Vol. XV, pp. 78 and 112.

waterways, especially to rivers. " . . . It should now be recognised," writes Stamp, "that nature has generally done more for a country in providing it with facilities for railway construction than with navigable rivers, in so far as these are merely inland waterways" ¹ The most important thing about a river is its accessibility to sea-going vessels: a river that is not directly accessible to these vessels, *i.e.*, one that cannot be used as a natural extension of the sea-board is not of any great value for transportation; inland communication can be better served by railways. The only disadvantage about railways is that of costlier haulage; but this is more than well balanced by speed and ease of inter-communication with different parts of a country. A railway is said to have a great advantage over a river even on a parallel course, as the lines running through the Indo-Gangetic Plain well demonstrate. Yet rivers are very useful—indeed almost indispensable—for the transportation of bulk freight at low cost. A train load of 7,000 tons, for example, is generally considered unusual, but barge-trains frequently carry much more without any fuss. This carrying of bulk freight (great quantities at one time) at low cost ² has been described as the special 'economic mission' of inland waterways. And it is of prime importance in densely populated regions with a super-abundance of raw materials, and "in countries not yet fully opened to modern commerce." Inland waterways often act as feeders to railways as well.

Another use of rivers is to feed navigable canals. With the introduction of railways, however, the importance of

¹ Chisholm's *Handbook*, p. 87

² This may be perplexing. But while the railway meets all its own costs by charging high, part of the costs in the case of water transport—such as the cost of construction and maintenance of canals etc.—are met by the government. Its freight charges are, therefore comparatively low. The balance is paid by taxpayers.

canals for navigation has greatly diminished. But the 'ship-canal' have, on the contrary, assumed enormous importance with the expansion of marine navigation. Lakes are, however, very important for inland water transport. Lake waterways are beyond comparison cheaper than either navigable canals or railways. It has been estimated that on the Great Lakes of North America, for instance, a ton of traffic may be transported to a distance of 1,250 miles for a dollar as against only 127 miles on the railway for the same sum.¹ This is not surprising at all, since lakes are ready-made highways costing next to nothing for upkeep. Such is also the case with other great lakes like the Caspian Sea, Lake Geneva, Lake Constance, Lake Titicaca, all of which are more or less important commercial routes.

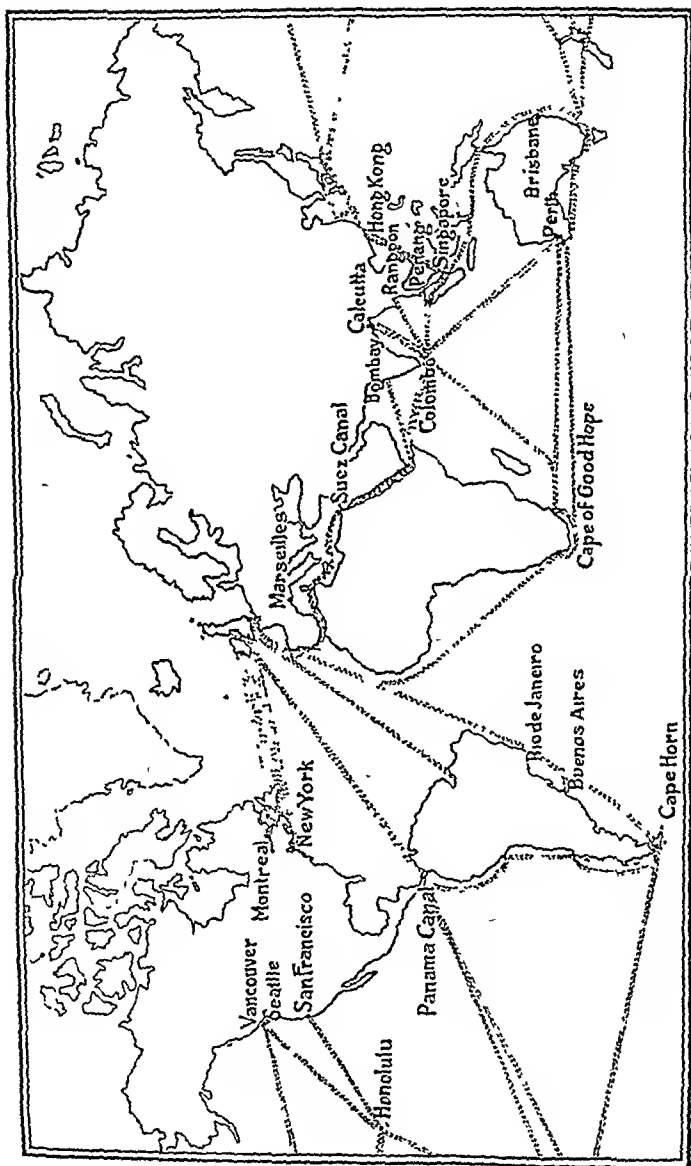
6. Ocean Transport.—The bulk of modern international trade is sea-borne. Yet ocean transportation is no novelty of the present age; it was well developed by Indians, Chinese, Phœnicians, Greeks, Carthaginians and Genoese long before the beginning of the Christian era. Even the mariner's compass, which among other things, has so repeatedly been made responsible for the inauguration of the so-called 'Modern Age' in European history, was known to the Chinese long before Christ was born. What, however, is particularly new is the introduction of the coal and oil-consuming giant steamers for ocean transportation in place of the old sailing-vessels.

Nevertheless sailing-vessels and small crafts for the navigation of the sea have not totally died out yet; the islanders of the Pacific Ocean still undertake pretty long voyages in small boats, and larger sailing vessels owned by

Ocean transport & mariner's compass no novelty

Liners and Tramps.

¹ H. G. Moulton, "Economic Aspects of Inland Water Transportation," *Journal of Geography*, Vol. XV, p. 77.



OCEAN TRADE ROUTES (1)

Europeans sometimes ply the 'seven seas' even today. But for all that these must now be regarded as exceptional. Modern seagoing vessels are classified as liners and tramps (unless, of course, they belong to the military marine) : a liner is a ship that plies regularly between foreign ports and usually carries certain specified types of products only ; a tramp is a drab general cargo ship, lacking in fixed routes and regular sailing schedules, and goes from port to port in response to offers of cargo at what it considers to be sufficiently attractive rates. The liners are adapted to the nature of the trade and make for specialization. Because of their speed and regularity liners now carry 80 per cent. of the total ocean traffic, while tramps specialize in the transport of bulk cargoes like grain, coal, fibre, timber, etc. Sailing-ships are also used in carrying bulk cargoes, but they are rapidly declining in number.

Ocean transportation is said to possess the greatest combination of advantages. It shares the advantage of cheap haulage for low speeds with water carriage of all kinds ; sea routes, unlike roads, railways and canals, cost nothing to maintain ; the ocean is free to navigation (except, of course, the so-called 'territorial waters') and can be traversed in all directions ; it imposes no limit to the increase of the size of vessels (although, apart from cost of construction and repair, the size of vessels is limited by accommodation available at ports and the dimension of ship-canal). All these advantages are said to outweigh the great risk of loss at sea than on land from storms and the like.

But though the oceans are traversable in all directions and they cover nearly three-fourths of the earth's surface, definite routes of travel have been established across them ; beyond these 'sea lanes' and 'trade routes', as they are called, the vast expanses are completely deserted. Several factors

Advantages
of ocean
transportation

Ocean
Trade
Routes.

have naturally played their respective part in determining these lanes and routes. The first principle of ocean navigation is to take the shortest cut between two places as far as practicable. Owing to the sphericity of the earth such a route is always the arc of a great circle, of which the centre of the earth is the inevitable centre. This sounds simple enough, but it is not so simple as it appears at first sight. The earth, we know, is not a sphere, but a spheroid. So, where it is a north-and-south route, the shortest cut lies along a meridian, but where the route is from east to west or the reverse, the shortest cut deviates from the parallels of latitude in proportion to its distance from the equator; it is only on the equator that it lies along a parallel of latitude, *i.e.*, along the equator itself. Since these parallels are shorter and shorter towards the poles, the shortest of the east-and-west routes in the Northern Hemisphere deviates most in a curve towards the north from the parallel connecting places at the ends of the route; in the Southern Hemisphere it deviates farthest towards the south. But this principle has to be modified by certain other considerations. There may be land in the way on a great circle route (shortest cut), and this may cause considerable deviation. So also does the climate of a region cause deviation from a great circle course. The circle route from Cape Town to Wellington (New Zealand) lies to the south of the Antarctic Circle, but the actual passage of ships takes a more northerly route. Coaling stations and oiling-bases, again, oblige ocean-going vessels to modify their routes sometimes, but these are situated along the great curve routes as far as practicable. Ocean currents and winds are also important factors in determining sea lanes and trade routes, but these concern the sailing-vessels, modern steamers being practically independent of them.

The Principal Ocean Routes of the World

1. **The North Atlantic Route.**—Of all the ocean routes this is the busiest, connecting, as it does, the two leading commercial regions of the world—Western Europe and Eastern United States.¹ Various other ocean lines issuing from the numerous ports on the Atlantic coasts of Canada, the U.S.A., Mexico and the islands of the West Indies converge into the North Atlantic Route, and on reaching the European side of the Atlantic Ocean it splits into separate lines to reach the different ports of Western Europe. For European vessels the principal ports of departure are London, Liverpool, Southampton, Glasgow, and Bristol in Great Britain; Dublin, Cork, Waterford and Limerick in Ireland; Marseilles, Le Havre, Rouen, Dunkerque, Bordeaux, La Rochelle, Nantes and Cherbourg in France; Antwerp, Ghent, Ostend and Bruges in Belgium; Amsterdam and Rotterdam in Holland; and Hamburg, Bremen and Emden in Germany. Ports of call are New York, New Orleans, Galveston, Philadelphia, Boston and Baltimore in the U.S.A., and Halifax, St. John, Montreal and Quebec in Canada. Eastbound traffic over this route still consists mainly of raw materials like wheat, paper and pulpwood from Canada and cotton from the U.S.A., whereas west-bound traffic consists mainly of manufactures; but this 'unbalanced traffic' is gradually disappearing as more manufactured articles are now being exported to Europe from the U.S.A. instead of an overwhelming proportion of raw materials, especially cotton. In the foreign trade between the U.S.A. and the U.K. on the eve of the Great War II, the export of the U.S.A. exceeded more than twice as many tons of goods as she used to import from the U.K., and

Connecting Western Europe with Eastern U.S.A., Canada & Mexico.
Chief ports.
Nature of commerce.
Present revolution.

¹ Half the world's shipping (approximately) is engaged in the North Atlantic.

her exports to continental Europe exceeded her imports therefrom by more than a million tons annually. The War completely turned the balance of this unbalanced trade the other way about.

2. **The Mediterranean Trade Route.**—Next to the North Atlantic Route, this is the most important ocean route in value and volume of traffic. It extends through the Mediterranean Sea, the Suez Canal and the Red Sea. The Suez Canal may well be described as the meeting-place of the East and the West as well of the North and the South: it is where all the European and North Atlantic lines converge with those from East Africa and the Far East and also with most of the lines from Australia and New Zealand. The Mediterranean route, therefore, interconnects such regions as differ markedly from one another in commercial products and economic activities. Westbound traffic over it consist of a rich variety of raw materials and foodstuffs like jute, silk, rubber, skins, leather, tea, coffee, rice, wheat, sugar, meat, spices, indigo, tin, timber, etc; eastbound traffic consist almost solely of a great variety of manufactured articles, especially cotton piece-goods and machinery. This is perhaps the most glaring instance of unbalanced international trade. Principal ports to the west of the Suez are London, Liverpool, Southampton, Manchester, Glasgow, Bristol, Rotterdam, Hamburg, Marseilles, Lisbon, Genoa, Naples, etc: to the east the chief ports are Bombay, Calcutta, Rangoon, Singapore, Colombo, Aden, Hongkong, Shanghai, Nagasaki, Yokohama, Manila, Perth, Adelaide, Sydney, Melbourne, Durban, Zanzibar, Mombasa, Mozambique, etc. The chief coaling-stations on the route are Gibraltar, Marseilles, Algiers, Port Said, Colombo, Singapore, Batavia, Hongkong, Shanghai, Nagasaki and Yokohama. Many of the coaling-stations are also important *entrepôts*. Eastbound vessels

land many goods at Gibraltar for ports on the Mediterranean at which they do not call or for ports on the Black Sea; westbound vessels likewise land several goods at Port Said for the same purpose. Aden is another such *entrepôt* for goods destined to reach East Africa. At Colombo, another coaling-station and *entrepôt*, the route branches out in two directions, one of the lines going round the south of Australia, the other to Singapore, where it again branches out into two, one for passing round the north of Australia, the other to China and Japan. Several important branch lines proceed from Singapore to Indo-China, North Borneo and the Philippines.

Before the opening of the Suez Canal in 1869, trans-oceanic commerce between North Atlantic countries and the East had to pass around the Cape of Good Hope, or goods had to be transported by land across South-Western Asia or North-Eastern Africa (trans-continental trade). With the opening of the Suez Canal and the development of modern coal and oil-consuming vessels trade has flourished, the time required for the voyage has been greatly minimized. The Canal has, for instance, reduced the distance between New York and Calcutta by 2,500 miles.¹

Importance
of Suez
Canal

¹ The construction of the Suez Canal was undertaken by Ferdinand de Lesseps, a Frenchman, in 1859 and was completed by him in 1869. The Canal was declared open in November of that year. Its length (from Port Said to Suez) is 100 miles, breadth between banks now varies from 400 feet to 460 feet and its depth now is between 35 and 39 feet; the present bottom width is between 148 and 195 feet. Average duration of transit through it is some 16 hours. It is at sea level throughout. In 1929 the canal was used by no less than 6,274 vessels totalling 33,465,000 tons. But the traffic has been on the wane since. In 1935 the total number of vessels passing through the Suez Canal was 5,992 with a total capacity of 32,811,000 tons. The management of the canal is in the hands of a company in which the British Government has a considerable number of shares.

3. The South African or Cape Route.—Until the opening of the Suez Canal this was the only trans-oceanic route between the North Atlantic countries and the East. It was opened by Vasco da Gama in 1498 when he reached India by way of the Cape of Good Hope. It connects Western Europe not only with the western and southern parts of Africa, but also with Australia and New Zealand. Nearly half the total export of Australia to Britain is transported by way of the Cape. The principal ports in South Africa on this route are Capetown, Port Elizabeth, East London and Durban; those of Australia are Sydney, Melbourne, Adelaide and Fremantle. Durban is the most important coaling-station, and Capetown the chief centre of South African trade. General exports of S. Africa are foodstuffs like maize, fruits and sugar, raw materials like wood and diamonds, and manufactures like gold bullion; general imports, foodstuffs like wheat, raw materials like food, mineral oils, chemicals and drugs, and manufactures like piece-goods of silk, wool and cotton, jute and cotton bags and machinery. General exports of Australia are raw materials like wool, hides and skins, and lead, foods like wheat, butter, meat, sugar and fruits, general imports, raw materials like silk and cotton goods, yarn and cordage, bags and sacks, chemicals and machinery. The bulk of the trade over this route is carried by freight steamers and sailing-vessels. Mail and passenger steamers between N. W. Europe and Australia, however, take the Suez Canal route. But since the distance saved by the Suez Canal is not much—only 1,000 miles on the average—and in order to avoid the high canal tolls, freight steamers generally take the Cape route. Sailing-vessels also avoid the Suez Canal on account of the adverse winds over the Red Sea.

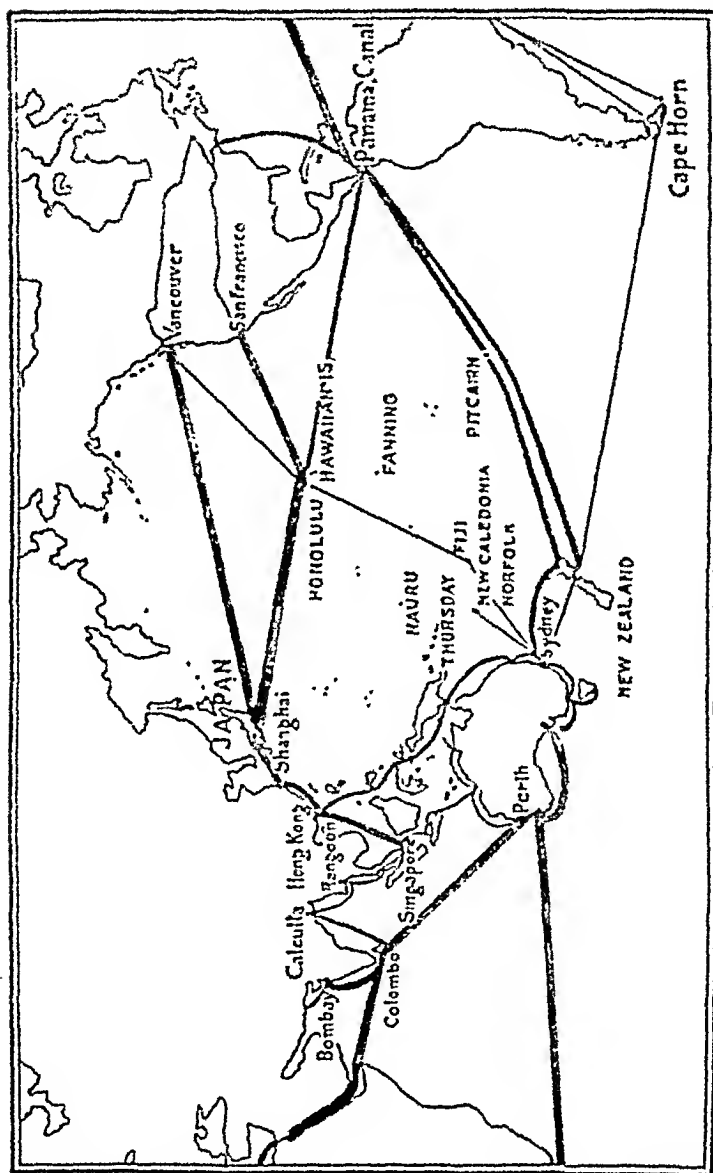
4. **The Panama Canal Route.**—The Panama Canal was opened in August 1914. It connects the Pacific Ocean with the Atlantic, and has naturally brought about many far-reaching changes in ocean routes: the distance by sea between the eastern (Atlantic) and western (Pacific) coasts of North America has now been reduced by about 7,000 miles,—New York on the Atlantic seaboard is, for instance, 7,873 miles nearer by sea to San Francisco on the Pacific coast than formerly. Prior to the opening of the Panama Canal there was no sea-borne trade between these two coasts of N. America. It has also reduced the distance between the Atlantic coast of N. America and the Pacific coast of S. America by nearly 4,000 miles; thus Valparaiso in Chile (S. America) is roughly 8,500 miles from New York by the Strait of Magellan or Cape Horn, whereas by the Panama Route it is only about 4,600 miles. The Panama Canal has brought Australia and New Zealand closer to the United States; Sydney in Australia is nearly 13,500 miles from New York by the Suez Route, but by the Panama Route it is about 9,700 miles; the distance between New York and Wellington (New Zealand) by the Strait of Magellan is considerably over 11,000 miles, whereas by the Panama Route the distance does not exceed 8,500 miles. Japan has also been brought closer to the U. S. A. by the Panama Canal; the port of Yokohama (Japan) is above 13,000 miles from New York by the Suez Canal, whereas it is considerably less than 10,000 miles from New York by the Panama Canal. The western sea-board of both the Americas has also been brought nearer to Europe by more than 5,000 miles on the average. Yet the Panama Canal is essentially an American highway. It has, doubtless, opened up a new route to Australia and New Zealand from Europe, but this new route has effected practically no reduction of distance;

Importance
of Panama
Canal.

Panama
essentially
American
Canal.

the distance between Sydney (Australia) and Liverpool (Gr Britain) is some 12,400 miles by the Panama Route and about 12,200 miles by the Suez Route, that between Liverpool and Wellington (New Zealand) is over 11,000 miles by the Panama Canal and about 12,500 *via* Suez. Europe has not, therefore, been able to derive much advantage from the Panama Canal; most of her shipping take the Suez Canal Route for trade with Asia, Africa and Australia. Until 1923-24 the traffic through the Panama Canal remained much smaller than that through the Suez Canal; but the scale has now apparently turned in favour of the former. This has, however, been attributed mainly to the growth of the carriage of oil from California to the eastern (Atlantic) side of America. Of the commodities passing through the Panama Canal, lumber from Puget Sound is said to occupy the next place; other important commodities are wheat, China tea, Chilean nitrate and Australian meat.¹ It is extremely significant that the total tonnage of cargo carried from the Pacific to the Atlantic exceeds that moving in the reverse direction by more than 10 million tons. Although the traffic through the Panama Canal now exceeds that through the Suez Canal, the former does not yet seem to have such basic advantages as the latter. The regions along the Panama Canal Route are, unlike those along the Suez Canal Route, neither densely populated nor noted for productivity; the Pacific Ocean, moreover, may well be described as a vast water-desert. Important ports of call along the route are Colon, San Diego, Vancouver, Prince Rupert, Callao and Valparaiso in the Americas, and Nelson, Christchurch, Auckland and Dunedin in New Zealand. Newport News, Bilbao and Honolulu are important coaling-stations on the line. The Panama Route has gradually joined the

¹ Chisholm's *Handbook*, p 697



OCEAN TRADE ROUTES (II)

various Atlantic Routes on the one hand and Pacific Routes on the other.¹

5. **The Pacific Routes.**—The Pacific Ocean is steadily becoming more and more important as a commercial highway. This development is due mainly to American endeavour. the opening of the Japanese ports to foreign trade, the gold rush to California in the middle of the last century, the possession by the United States of Alaska, the Hawaiian Islands and the Philippines and the construction of the Panama Canal are said to be the chief factors responsible for the development of the Pacific trade routes. The main line connects the western seaboard of the United States with Eastern Asia, particularly with Japan and China. Another important line has established communication between the Philippines and the U. S. A. The trunk line that goes to Japan starts from the Puget Sound region and California and swerving northward reaches Yokohama by way of the Aleutian Islands; the other trunk line swerves southward to the Hawaiian Islands and then proceeds westward to Eastern Asia. There are direct routes to the Philippines as well. Important ports along these routes are Seattle, San Francisco, Los Angeles, Vancouver, Manila, Yokohama and Shanghai; Honolulu is a very important coaling-station for vessels plying along the Hawaiian Islands. There are a number of ocean lanes connecting Australia and New Zealand with the various American states. The opening of the grand trunk line to Japan has been followed by the remarkable development of trade between that country and the U. S. A. The United States is now Japan's chief customer as well as her chief supplier:

¹ The length of the Panama Canal is 50 miles, the minimum depth of canal, 41 feet, minimum bottom width of channel, 300 feet. The average duration of transit through it is between 7 and 8 hours.

the United States supplied 27·4 per cent. of all the imports into Japan in 1924, 29·2 per cent. in 1926-30 and 32·4 per cent. in 1931-35, and purchased 41·2 per cent. of Japan's exports in 1924, 40·4 per cent. in 1926-30 and 27·0 in 1931-35.¹ Equally remarkable has been the development of trade between the U. S. A. and the Philippines; since the latter was taken possession of by the U. S. A. (1898), the overseas trade has multiplied thirty-five times.² But the nature of the trade passing along the Pacific Routes is, on the whole, extremely unbalanced; the total tonnage of goods bound for the Far East (westbound) is nearly four times as large as that bound for the Far West (eastbound to America). This has been attributed to the fact that the U. S. A. generally exports bulky commodities and imports goods of lesser bulk but of high value. Thus in 1929, for example, the U. S. A. exported more than 593 million pounds of raw cotton to Japan, but imported only 74 million pounds of silk, and while the silk was valued at 348 million dollars, the cotton was worth only 127 million dollars. The trade between the U. S. A. and China also presents the same spectacle: the principal exports to China from the U. S. A. are kerosene, tobacco leaf and raw cotton, while the chief imports of the U. S. A., from that country is silk.³ Other important exports from the Far East are tea, rice, hemp, etc., and those from the Far West are wool, metal goods and machinery. This 'unbalanced trade' of the United States has its parallel in her trade with Western Europe in normal times.

6. South American Routes.—These routes have some similarity with the South African or Cape Route. Prior to the opening of the Panama Canal, oceanic commerce

and

between
U.S.A. &
Philip-
pines.Nature of
TradeAn old
route.

¹ Chisholm's *Handbook*, pp. 640-41

² Case & Bergsmark, *College Geography*, p. 652

³ *Op. cit.*, pp. 652-53.

between the eastern and the western seabords of America had to pass around Cape Horn or the Strait of Magellan. This traffic has now dwindled in importance. Yet sailing-vessels still continue to ply around the Horn between the Atlantic and Pacific ports of America, because it is difficult for them to use the Panama Canal owing to the calms of the Panama Bay.¹ These South American routes connect West Indies, Brazil and the Argentine Republic. Chief ports along these lines are Kingston, Havana, Vera Cruz, Tampico, La Guaira, Georgetown, New Amsterdam, Paramaribo, Pernambuco, Bahia, Rio de Janeiro, Santos, Montevideo, Buenos Aires, Bahia Blanca and Rosario. Of all the South American routes that of the east coast is most important for commerce; for along that line lie the coffee-exporting ports of south-eastern Brazil and the equally important ports of the River Plate region whence grain, sugar, meat, wool, hide and rubber are exported to the U. S. A. and Europe.

7. **Aerial Transport.**—Aerial transport is a twentieth century development, although experiments with balloons go at least as far back as 1782 when Stephen and Joseph Montgolfier, two French brothers, conceived the idea of employing 'heated air' to lift bodies. Subsequently hydrogen and other gases were used. With the invention of the internal-combustion engine came the first aeroplane—a machine heavier than air. This petrol engine is now used on airships or dirigibles which are made lighter than air by the use of hydrogen or other gas. Seaplanes, hydroplanes and flying boats are specially designed for landing on water; they, too, are, like the aeroplane, heavier-than-air machines. It was only in 1910 that the first aeroplane crossed the English

¹ The Strait of Magellan is extremely difficult to navigate; sailors therefore prefer to take even the more stormy passage round Cape Horn.

Channel. The Four Years' War of 1914-18 was responsible, more than any other event, for the rapid development of aerial navigation. The Zeppelin is also a lighter-than-air machine, christened after its designer Count Zeppelin of Germany. British and American experiments after the War with new types of airships and flying boats having proved disastrous, these were abandoned. But Germany succeeded in establishing a mail and passenger service to South America with the now famous Graf Zeppelin. The use of aeroplanes, however, has developed in all civilized countries.

Aerial transportation is now employed chiefly for the rapid transfer of mails, passengers and precious articles. It is advantageous in long journeys only, particularly in trans-continental flights. In short journeys railways are still supreme. At present regular air services have linked up most of the important cities of the world. The British airways between Europe on the one hand and Asia and Australia on the other generally start from Croydon (London), and passing through Marseilles, Athens, Alexandria, Cairo, Gaza, Baghdad, Bahrein, Sharjah, Karachi, Jodhpur, Delhi, Allahabad, Calcutta, Rangoon, Bangkok, Penang, Singapore, Batavia, Darwin, Brisbane, Sydney etc., reach Melbourne in Australia. The French and the Dutch also maintain air services along this route as they, too, have vested interests in the Far East and the South. There are air services between England and Africa as well; the British airway starts from Southampton and goes to Khartoom *via* Alexandria after crossing the Mediterranean Sea; at Khartoom the line branches out in two directions—one terminating at Capetown in the south and the other at Lagos in the west. The French and the Italians also have regular airways from Europe to Africa—to their respective possessions of French Equatorial Africa *via* Bathurst and of Madagascar across the Sahara.

Aerial
transportation

etc.
Railway
transportation

Chief
airways

Between
Europe
and Asia
and
Australia.

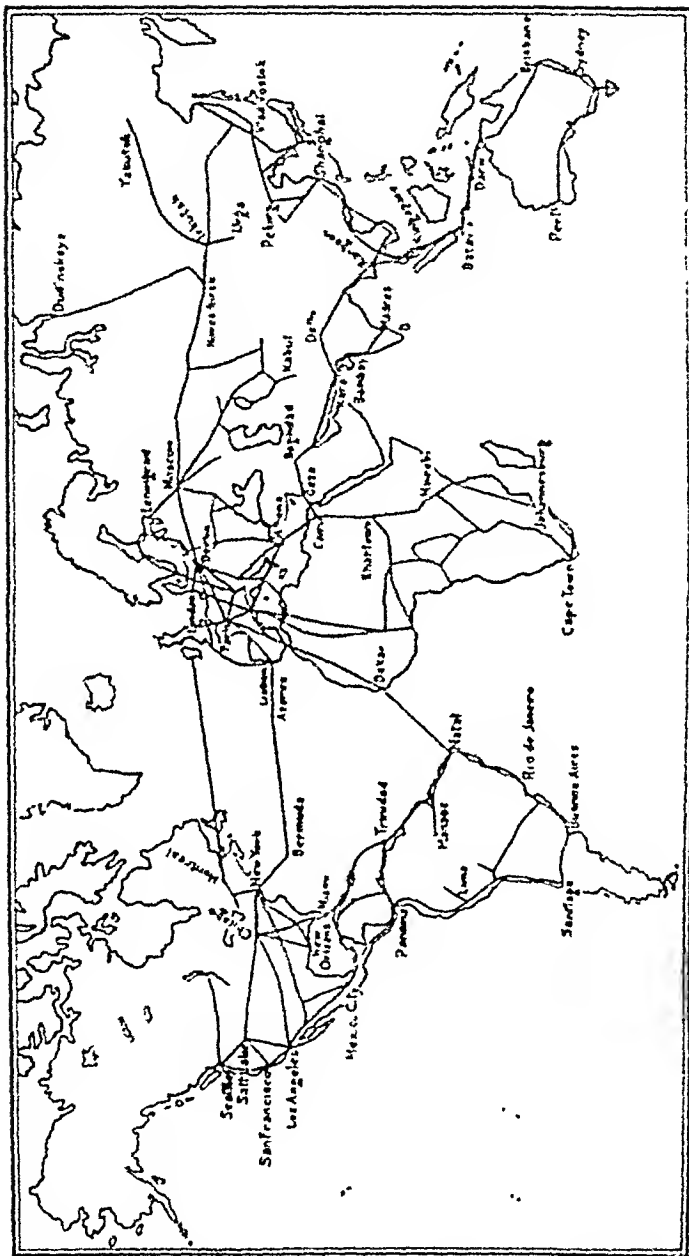
Europe-
Africa

Europe-
America

and the Congo, and to Addis Ababa *via* Tripoli and Cairo. Airways between Europe and America have been developed by the French and the Germans. The African airport of Bathurst usually forms the point of departure and the Brazilian port of Pernambuco the terminus, thence a line radiates to Santiago in Chile and another to the various airports of the U. S. A. This is a trans-Atlantic air route. Airways across the Pacific Ocean connecting America and Asia are maintained by the U. S. A. The point of departure usually is San Francisco whence the trunk line goes to Canton *via* Honolulu and Manila. The continents of Europe and America (particularly the U. S. A.) are well served by air services. Regular commercial air services are established all over Europe. Germany was till lately the leading air-transport power in the world. In 1928, however, the U. S. A. first surpassed Germany in the development of airways. The total freight and mail carried by aeroplanes and airships in the U. S. A. that year was well over 2500 tons, in Germany just 2500 tons, in France a little above 1250 tons, in Holland about 750 tons, in Great Britain 600 tons, in Colombia just short of 500 tons, in Poland nearly 275 tons, and in Italy 250 tons.¹ Important airports of the U. S. A. are New York, Washington and Boston on the east and San Francisco, Los Angeles and Seattle on the west.

Commercial and Industrial Towns.—A moment's glance at the topographical map of any country or region will at once reveal to the student that any random spot is not convenient for the exchange of commodities on a commercial scale, while certain other places are eminently suitable for such transaction. A study of the various towns, big and small, within a given region will, on the other hand,

¹ Compiled from Case & Bergsmark, *College Geography*, p. 666.



THE AIRWAYS OF THE WORLD

show that these are all, more or less, centres of exchange for the districts around. The inevitable conclusion from these data is that a town is always a centre of exchange, even if all the spots favoured by topography for commercial and industrial development are not towns. It is necessary, therefore, to study the factors that help to the growth of towns and cities as well as of commercial and industrial areas. These are, however, of various kinds, and it is customary to enumerate them in some such way as follows —

(a) Many of the world's most famous cities owe their origin and development mainly to religion. Familiar instances are Mecca, Jerusalem, Benares, Lhasa etc.

(b) Several other towns have grown up to be what they are chiefly as educational centres. Obvious instances are Oxford and Cambridge.

(c) Health and pleasure resorts also sometimes grow up to be more or less important towns. Vichy, Bath, Saratoga, Darjeeling etc., are some of the instances.

(d) Natural wealth, especially minerals, are responsible for the growth of many important towns. Scores of instances may be cited at will. Unfavourable climate is no hindrance to the growth of towns located in the vicinity of mineral deposits as the towns of Northern Chile and Western Australia show.

(e) Nearness to the site of water-power is another factor helping the growth of towns. The 'fall-line towns' of the U. S. A., like Buffalo, Holyoke, Minneapolis, St. Paul etc. are well-known instances.

(f) Towns often grow up at the meeting of hill and plain, at the confluence of navigable rivers, at the highest point to which a river can be navigated, at points where a river suddenly changes its course, and at spots where surface

relief lead to the convergence of various railways or roads. Milan at the foot of the Alps is a place where commodities from the mountains can be exchanged for those of the plains. Allahabad, Lyons, Manaus, St. Louis, Frankfort-on-Main, Pittsburg etc. have grown up at the junction of rivers. Chicago, Toronto, Winnipeg etc. are important railway junctions.

(a) Towns often spring up where physical and other conditions necessitate a change in the mode of transport or where it is most convenient to deposit bulk goods for their eventual distribution. Sea-ports are the most outstanding examples of this class of towns.

(b) Many towns owe their origin and growth to strategic advantages of location. Copenhagen, Istanbul, Gibraltar etc. are notable examples.

(c) Historical and political movements are also responsible for the growth of many towns. Paris, Washington, Berlin etc. may be cited as familiar instances.

It is clear from the foregoing analysis that of all the factors responsible for the growth and development of towns, location is by far the most important, indeed it very nearly subsumes under it all the other factors, topography included. According to Semple it is the supreme geographical fact in history; "area itself, important as it is, must yield to location."¹ A place of pilgrimage will not develop into a large town or centre of business if located unfavourably for the exchange of commodities. Badrinath in the mountain fastnesses of the Himalayas has not developed into a town at all. The importance of Benares, on the contrary, lies in its favourable position in the Gangetic

Importance of location in determining the origin and development of towns.

¹ E. C. Semple, "Geographical Location as a Factor in History," *Geographical Society Bulletin*, Vol. 40, pp. 65-66.

Valley. Mecca was an important city even in pre-Muslim days, and so was Jerusalem in pre-Christian times; both the cities are remarkably situated. As for educational centres the truth is that towns rarely grow up because of universities, but universities are established where towns have already sprung up. The situation of the two most famous universities of England—that of Oxford and Cambridge—in the east midlands is important; Oxford, moreover, is now a centre of England's motor industry. Other university towns of England—London, Liverpool, Leeds, Durham, Sheffield, Manchester and Birmingham—are important business centres as well.

Another thing to be noted in this connection is the fact that most of the great cities of the world are sea-ports *i.e.*, situated on or near the margin of the sea. A port is a gateway between the land and the sea, and thus performs the dual function of loading and unloading cargo.

The importance of a port depends primarily on two factors—(1) *the facilities it can afford to shipping*, and (2) *the productiveness and accessibility of the region it serves*. The entire region served by a port is called its hinterland, and where ships can have a place of shelter is known as a harbour. A port must, therefore, have a harbour in front and a hinterland behind. Harbours may be either *natural* or *artificial*: a natural harbour is essentially an indentation in the coastline spacious and deep enough to admit ocean-going vessels and sufficiently protected by topographical features from destructive winds and waves so as to provide a tranquil anchorage for shipping. Liverpool and Cork in Britain and San Francisco in the U. S. A. are said to possess excellent natural harbours. Where, however, topographical features are unfavourable artificial harbours are constructed for providing safe accommodation to shipping. In order to combat

the recurring shallowness caused by the deposit of materials due to streams, waves, current and tides, the work of dredging is repeated at frequent intervals. Large sums of money are thus regularly spent for deepening many such harbours. Breakwaters are also used for combating the destructive work of waves within the harbour area so that shipping may lie in safe anchorage; this is especially important where the harbour space is limited. But it must also be borne in mind that in these days of giant ocean liners the distinction between natural and artificial harbours has come to be one of degree only; for all the great harbours are now regularly dredged for the passage of ocean-going vessels. The essentials of a good harbour are (a) an approach channel of ample dimensions, (b) adequate protection against storms, (c) sufficient space for docks and wharves, (d) ample area, and (e) ample depth. For the accommodation of the largest vessels a harbour must have more than 40 feet of water. London, Liverpool, Southampton, Le Havre, Hamburg, Antwerp, New York, Boston, San Francisco, Rio de Janeiro and Sydney are the outstanding examples of deep water harbours of the world. Another factor determining the value of harbours is the tidal range: the depth of water at high tide enables many ships to enter and clear a port at that time, where the water level does not permit this type of activity. Lighters are used for loading and unloading cargo. Another point of importance is the area of a harbour. New York, San Francisco, Rio de Janeiro and Sydney are among the extensive harbours of the world. Climate is another factor determining the value of not only ports and harbours but also of entire coastlines. Not a single harbour along the entire northern coast of Russia remains ice-free for the whole of winter. Even Vladivostok situated on the south-eastern coast of Siberia does not remain free from ice all

of large rivers Obviously such ports have the advantage of easy inland communication, but they often suffer from the silting up of river beds and the want of space for anchorage, docks and wharves Regular dredging is required to keep the ports open Familiar instances are Calcutta and Chittagong; London, situated at the head of the Thames estuary 55 miles from the sea, is another example.

(d) *Bay Ports at river mouths*, however, are ideal for commerce. They combine all the advantages of ordinary Bay Ports with those of the Estuarine Ports. New York at the mouth of the Hudson may be cited as a good illustration.

Many important commercial towns, we have already noted, grow up on river banks. These are *river ports* properly so called Some of these are located at the highest point to which rivers can be navigated, some others where further navigation is difficult owing to the existence of a rapid or a fall, still others at the turning points of rivers. The value as well as the importance of these ports depends on two primary factors—(a) the productivity of the region served by them and (b) the navigability of the rivers Narayanganj, Goalundo, Chandpur and Jhalakati are some of the important river ports of Bengal. Narayanganj is a collecting and distributing centre which act as a clearing-house for the jute and rice of Eastern Bengal; Goalundo is noted for its fish trade; Chandpur acts as a clearing-house for the products of the fertile Surma Valley of Assam; Jhalakati, with the adjoining port of Nalchiti, is a centre of the betel-nut trade of Eastern Bengal. Gauhati, Dibrugarh and Sylhet are all important river ports of Assam. All these ports are situated on rivers navigable by steamers Much of the jute and paddy brought to the mill towns on

the Hooghly such as Naihati, Bhatpara, Titagarh and Serampore are transported by the waterways of the Delta

Another word frequently met with in books on commerce is '*entrepôt*'. An *entrepôt* is a port where commodities are imported for the purpose of re-exporting them to regions which cannot import them direct from their sources. Gibraltar, Marseilles, Algiers, Port Said, Aden, Colombo, Singapore, Hong Kong and Shanghai are among the great *entrepôts* of the world. *Entrepôts*

Important Ports of the World

Asia.—There are only four major sea-ports in India *India*
—Calcutta, Bombay, Madras and Karachi. Calcutta stands on the Hooghly, some 72 miles from the sea. The passage of the river is dangerous, especially to small crafts, owing to sand-banks and changes in the river bed. During the period of early influx of Europeans into India the river was navigable by ocean-going vessels for a considerable distance up stream, and many ports then flourished farther inland. These have now declined because of silting, which is a standing menace to Calcutta as well. The passage of the river upto Calcutta is only kept navigable at considerable cost. Moreover, the tidal wave which rushes up the river at high tide also helps to keep the waterway clear. Its wharves are, therefore, accessible to all but the largest ocean liners of today.¹ For facilities of inland communication, however, Calcutta is admirably situated: inland waterways connect her direct with the east and north of the Delta. The *Characteristics of port of Calcutta*
Inland communication.

¹ Possibly Calcutta is accessible to the largest ocean liners as well. But these do not ply in Indian waters, because the Suez Canal cannot accommodate them. At the time the Canal was constructed the liners were smaller than they are now.

Calcutta and Eastern Canal is one of the arterial channels of such communication. It enables the raw jute of Eastern Bengal to reach the mills of Calcutta and the adjoining parts at a very cheap rate. The city's proximity to the Raniganj coal-fields has also contributed much to the development of her manufactures. Of the important delta channels the Hooghly is the westernmost, and so railways from the west are not required to cross any large body of water; this has made Howrah on the opposite (west) bank of the Hooghly the terminus of railways from Delhi, Bombay and Madras to the great advantage of Calcutta, which is connected with Howrah by a bridge. Railways connecting Calcutta with North and Eastern Bengal and Assam radiate from Sealdah on the eastern boundary of the city. The hinterland of Calcutta is the largest in India; it includes Bengal, a. Bihar, the U. P., Orissa and Assam, and also extends to the Punjab beyond Delhi and to Central India in the neighbourhood of Nagpur. The bulk of Calcutta's exports—about 58 per cent—consists of *jute*, both raw and manufactured; other important exports in the order of importance are *tea*, *lac*, *oilseeds* and *cotton goods*. The principal items of import are *cotton goods*, *metals*, *machinery*, *government stores*, *railway stock*, *hardware*, and *oil*. Calcutta is often described as the 'Commercial Capital' of India. It is a fine estuarine port.

Bombay is the second city of India, and, according to many, the first 'if Howrah be excluded from the Calcutta agglomeration.' It owes its importance to several geographical factors: it has, first, a magnificent natural harbour; second, it is in command of two gateways through the Western Ghats; third, its location makes it the natural gateway to India from Europe; fourth, its hinterland includes the rich cotton lands of the Bombay Deccan; fifth, its climate.

like that of the west side of the Pennine Upland of England being highly suitable for cotton manufactures, has made it a great centre of cotton spinning and weaving; sixth, the water-power resources in the Western Ghats near by have added impetus to its cotton industry. But like New York, again, Bombay is now experiencing difficulty of expansion on its island site; the bay on the west of the city and north of the lighthouse known as the 'Black Bay' is now being partially reclaimed for more land. The city is now connected by railways with the larger island of Salsette behind it and also with the mainland. Thus inland communication has been established with the north, east and south so as to connect the city with Delhi, Calcutta and Madras. The hinterland of Bombay extends upto Delhi on the north, Jubbulpore and Nagpur on the east and almost reaches the city of Hyderabad on the south-east. The principal items of export are *raw cotton* (about 48 per cent), *cotton goods* (about 20 per cent), *cotton seed*, *linseed*, *groundnuts* and *sesamum*, *wool*, and *hides, skin and leather*. The principal items of import show a surprising sameness with those of Calcutta, except for the *treasure import* (gold and silver) which is virtually restricted to Bombay. Bombay is the great rival of Calcutta. It is a fine bay port.

Inland
Communi-
cation.Hinterland
of Bombay.Exports &
Imports

Madras is the third largest city in India, but the last of the four great ports. It was one of the many open roadsteads on the south-east coast of India. At present it is provided with a modern artificial harbour, constant dredging operations are required to keep it navigable. The city is well served by railways, and the *Buchingham Navigation Canal* provides a passage for small craft along the coast. The hinterland of Madras is neither so rich nor so extensive as any of the hinterlands served by Calcutta, Bombay and Karachi. The bulk of export—about 45 per cent of the total

Character-
istics of
Madras
portCommuni-
cation

Hinterland

—consists of *leather*; other items are *skins, raw cotton, cotton goods* and *groundnuts*. Imports are virtually the same as in the case of Calcutta.

Karachi is the third largest port of India, although it is not an industrial centre as Calcutta, Bombay and Madras are. It is situated on a small bay to the west of the mouths of the Indus. It has a natural rock-girt harbour, which has been much improved by modern engineering. The harbour is now protected by a breakwater. In some respects it is admirably situated, being readily accessible from the Makran Coast, from Basra and the Persian Gulf, from Aden and the Red Sea and from Bombay. Karachi is connected by railways with the Punjab and the N. W. F. P. *via* Multan, Lahore and Peshawar, with Baluchistan *via* Quetta and the Bolan Pass and with Delhi and Agra *via* Hyderabad and the Thar Desert. Its hinterland extends to Quetta and beyond as well as to Peshawar in the north and to Delhi in the north-east, while including the whole of Sind and the Makran Coast. The Makran Coast serves as a land-caravan route as well. The principal items of exports are *raw cotton* (more than 33 per cent) and *wheat* (about 25 per cent); other important items are *barley, oilseeds* (rape), *wool, gram* and *leather*. Imports are much the same as in Calcutta. Karachi may be described as a bay port at the mouth of a river; but the Sind Delta does not offer facilities for water carriage. With the introduction of air-mail services between India and foreign countries Karachi has become the leading airport of India.

Colombo is the chief seaport of Ceylon on the west coast of the island, and enjoys a virtual monopoly of the foreign trade. It is a great *entrepôt* as well. Its importance is due to the splendid geographical position it holds on the ocean highway from Europe to Australia and the Far East.

It has a magnificent artificial harbour, and is a most important port of call. It is connected by railways with all the important towns of Ceylon. Principal items of export are *tea* (50 per cent), *rubber* (25 per cent) and *cocoanut products* (18 per cent). Leading imports are foodstuffs like *rice* (29 per cent), *sugar*, *fish*, *grain* and *curry* (together 11 per cent), raw materials like *mineral oil*, *coal*, *fertilisers* and *rubber* (together 20 per cent), and manufactures like *cotton goods* (8 per cent), *iron* and *steel*, *machinery* and *motor cars* (together 6 per cent).

Communi-
cation.

Export &
Import.

Rangoon is by far the most important port of British Indo-China (Burma), handling, as it does about 86 per cent of the foreign trade of that country. It is situated some 20 miles from the sea on the Rangoon river to the east of the Irrawaddy Delta, and is connected by railways with Prome and Mandalay. It commands the land and water highways of both the Irrawaddy and Sittang Valleys. It is accessible to the largest ocean-going vessels plying in Indo-Chinese waters. By far the most important item of export is *rice* (62 per cent); next come *petroleum* and *tear* (together 14 per cent); other important exports are *teak* and *cotton* (together 8 per cent). Principal imports are *cotton goods*, *machinery* and *hardware*, *coal*, *silk* and *sugar*.

Indo-
China,
Malaya,
East
Indies, etc.

Character-
istics,
communi-
cation
and export
& import
of Rangoon
port

Bangkok is the great port of Siam or Thailand. It is situated on the river Menam, and is said to be visited annually by nearly 1,000 vessels with an aggregate tonnage of over 1,000,000 tons. But there is a bar at the mouth of the Menam, which does not permit large vessels to enter the port. Bangkok is connected by railways with Penang and Singapore. By far the most important item of export is *rice*—about 87 per cent of the total; next comes *teak*—only 4 per cent; another notable item of export is *tin*. Leading imports are *cotton manufactures* (17 per cent), *cigarettes*

Character-
istics,
communi-
cation,
export &
import of
Bangkok
port

(5 per cent), *iron and steel* (5 per cent), *gunny bags* (5 per cent), *yarns* (4 per cent), *silk* (3 per cent), *machinery* (2 per cent), *sugar* (4 per cent), *wine* (2 per cent), *gold leaf* (6 per cent), *mineral oil* (4 per cent), *precious stone* (3 per cent), and *opium* (3 per cent)

Saigon, the chief port of Cochin-China (French Indo China), stands on an outlet of the Mekong 34 miles from the sea. It is said to be annually visited by about 900 ships with an aggregate of nearly 2,000,000 tons. It has important channels of inland communication by railways and waterways. The chief exports are *rice, fish, fish-oil, pepper, cotton, copra, rubber* and *spices*. Chief imports are as usual *cotton goods, metal goods, silk goods, machinery, iron and steel, cotton yarn, motor cars, munitions, petroleum* and *sugar*. Rice export covers more than 60 per cent of the total export business.

Singapore is situated on an island of that name at the southern end of the Malay peninsula. It owes its importance mainly to its splendid geographical position at the junction of the world's great trade routes between the east and the west; it is the gateway of commerce between the Indian and Pacific Oceans. It has a magnificent harbour and large ship-building and ship-repairing yards have also been established here. It is the great *entrepôt* and coaling station of the Far East. It is connected by railways with Bangkok and Penang. Singapore is also a naval base for the British Admiralty. Large tin-smelting works have been established here. The trade of Singapore being that of a *entrepôt*, it imports and exports a large number of products which, however, are not shown in official returns separately for Singapore but for the whole of British Malaya.

Manila, the chief port of the Philippines, is on the Pacific trunk line between America and the Far East.

It has an excellent artificial harbour, and is connected by railways with San Fernando on the north and Batangas on the south. Leading exports are *sugar, Manila hemp, cocoanut oil, copra and tobacco*; leading imports, *cotton goods, silk goods, iron and steel, paper, vehicles, chemicals, electrical machinery, rice, wheat, dairy and meat products, fish, vegetables, oil, coal and tobacco*.

Hong Kong is situated near the mouth of the Canton river. It is an island, and is under British occupation. It is separated from the mainland by a strait only about a mile wide. It has a deep and commodious anchorage at Victoria Bay on the northern side of the island, moreover, the strait between the mainland and the island is an excellent harbour. It has also some of the largest ship-building and ship-repairing yards in the British Empire outside Great Britain. The Canton river is navigable for more than 600 miles from its mouth, and the great city of Canton, which resembles Calcutta in many respects, only about 90 miles north of Hong Kong, is very advantageously situated for the sea-borne trade of this island port. Hong Kong is said to be visited annually by 30,000 vessels. It is the great *entrepôt* for Southern China. The principal items of export from Hong Kong are *foodstuffs* (23 per cent), *treasure* (9 per cent), *piece goods* (9 per cent), *oils and fats* (7 per cent), *metals* (5 per cent), and *tobacco* (3 per cent). Chief imports are *foodstuffs* (41 per cent), *piece goods* (12 per cent), *oils and fats* (6 per cent), *metals* (1 per cent), *treasure* (5 per cent), *Chinese medicines* (4 per cent). Hong Kong is a free port.

Shanghai is the largest of the many 'treaty ports' of China. It is the great port of the Yangtze Kiang and the gateway of the most extensive and productive natural region of China. It is, however, not situated on the Yangtze Kiang,

but on a tidal creek 54 miles from the sea; it is on the Wusung or Hwangpu river, 14 miles from the confluence of the Yangtze Kiang and the Wusung. But a bar at the mouth of the Wusung long prevented the entrance of the largest vessels; the river has now been canalized and the largest vessels plying in Chinese waters are now admitted. Excellent shipbuilding yards have now been established at the port by Europeans. The Yangtze Kiang itself is an admirable waterway for more than 1,000 miles from its mouth, and several of its tributaries are also good inland waterways. Shanghai is also connected by railways with Tientsin and Peiping on the north and with Hangchow immediately south. Owing to the richness of its hinterland and also because of the dearth of good seaports in the region lying north of the Yangtze Kiang, Shanghai has grown into one of the great *entrepôts* of the world: it serves all the other Yangtze ports such as Nanking, Hankow, Chinkiang, Ichang, Kiukiang, Chungking, etc., as well as the whole of Northern China. Leading exports are *raw silk, beans, bean cake, vegetable oils, raw cotton, tea, coal, silk goods, metals and ores, eggs, groundnuts, etc.*; leading imports, *cotton goods, machinery, iron and steel, cigars, woollens, kerosene, raw cotton, tobacco, coal, indigo, rice, sugar, flour and fish*.

Canton, situated on the west bank of the Canton river, is the leading port of Southern China. Its situation in the Si Kiang delta region is analogous to that of Calcutta, but as to facilities for inland water carriage it is said to resemble Venice. Like Calcutta, however, Canton is situated 'on one of the most productive of tropical deltas'. Besides natural waterways and canals to link it up with various towns, Canton is connected by rail with Tientsin and Peiping on the north; another railway line has established connection between Hong Kong and Canton, but the running of

trains has been abandoned for some years. Regular steamer services between Hong Kong and Canton are, however, being maintained, and Canton is visited regularly by ships from foreign countries as well. The exports and imports are, on the whole, similar to those of Shanghai.

Most of the Japanese towns are seaports. But the most important seaport of Japan is Yokohama, the outport of Tokyo which is not accessible to large vessels. Yokohama has a safe and commodious harbour accessible to the largest liners plying the Pacific. It deals with miscellaneous articles of trade. Kobe, provided with an excellent harbour, serves mainly as the outport of Osaka, the leading centre of Japan's cotton-spinning industry. Osaka itself is accessible, like Tokyo, for small vessels. Nagasaki has an excellent harbour and a great ship-building yard. The leading exports of Japan are *raw silk* (38 per cent), *cotton goods* (23 per cent), *silk goods* (7 per cent), *coal* (2 per cent), and *pottery* (2 per cent); leading imports, *raw cotton* (27 per cent), *iron* (7 per cent), *machinery* (5 per cent), *chemicals* (5 per cent), *oil-cake* (5 per cent), *wood* (4 per cent), *wool* (4 per cent), *woollen goods* (4 per cent), *sugar* (3 per cent), *paper* (2 per cent), *rice* (2 per cent), *wheat* (2 per cent), *miscellaneous metals* (2 per cent), and *beans and other foodstuffs* (6 per cent).

Port Arthur and Dairen on the Liau-tung peninsula in Manchuria and Vladivostok on the east coast of Asiatic Russia are notable ports for their respective locations. All of them are well served by railways for inland communication. Of these Dairen is probably the busiest port, acting, as it does, the part of the great outlet for Manchurian products. The leading exports of Manchuria are *bean cakes*, *beans*, *bean oil* (together 50 per cent), *wheat* (12 per cent) and *other cereals* (8 per cent), *coal* (4 per cent), *silk yarn*,

Port of
Yokohama.

Part of
Kobe.

Port of
Nagasaki.

Manchu-
ria and
Asiatic
Russia.

Ports of
Dairen,
Port
Arthur &
Vladi-
vostok.

Kaoliang and lumber Vladivostok on the Sea of Japan is Russia's most important harbour and naval station in the Far East. It is connected by rail with Moscow and Leningrad. The trade, however, is small, and the port would remain ice-bound for several months of the year were it not for the use of ice-breakers. Harbin is an important inland town of Manchuria, situated at the spot where the railways diverge for Vladivostok, Port Arthur and Dairen. Its neighbourhoods are rich in coal measures and forests. Moukden is the great inland trade centre of Manchuria; there is a large production of coal from its neighbourhood.

Izmir, formerly Smyrna,—apart from Istanbul (Constantinople)—is the leading port of Turkey. It is situated on the Gulf of Smyrna, Aegean Sea, and serves as the chief outlet of the west coast. It possesses an excellent natural harbour commodious enough for the largest ships. The hinterland comprises the valleys of the Caicus, Hermus, Cayster, Meander and Indos, which together form the richest and most important region of Turkey. The Izmir region is rich also in mineral deposits, some of which are now being worked. Though not very well served by railways, it has railway connection with many important places such as Ankara in the interior and Adana and Alexandretta on the Mediterranean coast. The principal items of exports are *raisins, valonia, cotton, opium, figs, barley, liquorice, carpets, wool and sponges*. Chief imports are *cotton goods, woollens, metals and cereals*. Trabzon, formerly Trebizond, is the chief port on the Black Sea, serving the north-eastern region of Mediterranean agriculture. Istanbul, formerly Constantinople, belongs to European Turkey. Situated between the straits of Bosphorus and Dardanelles it holds a most strategic position. Much of the trade between Western

Europe and Turkey is carried on by way of this important city.

Beirut is the chief port of Syria. It is connected by a road and a railway with Damascus. Alexandretta, the port of Aleppo, lies farther north. Haifa in Palestine is a notable port south of Beirut; a railway connects it with Cairo across the isthmus of Suez. But Jaffa is at present the leading port of Palestine. Syria's chief exports are *cotton and cotton thread, raw wool, animals, raw silk and cocoons, fruits and nuts*, chief imports are *textiles* (cotton wool and silk) and *cereals*. Palestine's exports are *oranges, soap, water melons, wine, almonds and skins*; her imports are *foodstuffs* (rice, flour, sugar, etc.), *manufactured goods* (cotton fabrics, motors, etc.), and *raw materials* (kerosene, benzine, wool, etc.) The foreign trade of the whole region is extremely unbalanced: Syria's imports are more than double the exports in value, while Palestine's imports exceed her exports nearly five times in value. Aden, on the south coast of Arabia, possesses an admirable natural harbour and serves as a great *entrepôt* in the trade between Asia, Africa and Europe. It is a fortified coaling station as well. The opening of the Suez Canal has increased its strategic value to a great extent.

*Arab, Asia
and Near
East.*

*Ports of
Beirut,
Aleppo,
Haifa,
Jaffa and
Aden.*

Europe.—The first nine seaports of the United Kingdom, according to Stamp, are London, Liverpool, Hull, Southampton, Manchester, Glasgow, Harwich, Bristol, and Grimsby. Of these London and Liverpool are by far the most important, handling, as they do, 60 per cent of the total trade of the United Kingdom between them, London leads in exports, Liverpool in imports. London's pre-eminence is due, among other things, to its excellent situation at the head of the Thames estuary, about 55 miles from the sea. It is accessible to the largest ocean-going vessels. The month

*United
Kingdom.*

of the Thames is directly opposite another important estuary—that of the Scheldt, and nearly opposite the mouth of the Rhine. This has given London a commanding position in its trade with continental Europe. It is now one of the biggest *entrepôts* of the world—in fact, the greatest import market the world has yet seen. London handles more than 50 per cent of the trade of the United Kingdom. But curiously enough it is situated in the heart of the agricultural region of England and has no coal, no iron, no water-power; nor has it any outstanding manufacture. It is now the chief railway centre for the British Isles, and its docks have been built at great expense. The exports and imports of London are of a miscellaneous kind. Liverpool is situated at the mouth of the Mersey; the harbour is said to be commodious enough for 'all the fleets of the world'; the hinterland comprises Preston, Accrington, Burnley, Bradford, Leeds, Bolton, Blackburn, Oldham, Manchester, Sheffield, Northwich, Nottingham, Leicester, Birmingham, etc.; the chief articles of commerce are *cotton goods, woollens, cutlery, leather, hardware, potteries, and glass and chemicals*. Of these cotton goods are by far the most important. The damp climate and the abundance of soft water from the Pennines are said to be ideal for cotton manufacture. The principal item of import is, of course, *raw cotton*. Liverpool is now connected with the port of Manchester by means of the famous *Liverpool-Manchester Ship Canal*, which has enabled shipments of cotton to reach Manchester direct. Manchester is the town most closely associated with the cotton industry of Great Britain. Hull, at the confluence of the rivers Hull and Humber, serves the northern midlands, and to a lesser degree the southern midlands and London as well. Like London it also handles miscellaneous goods. The hinterland of Hull, as also that of Goole and

Grimsby, overlaps with that of Liverpool. Southampton is the chief commercial port on the south coast of Britain. The harbour is commodious, and it is an important port of call for trans-Atlantic vessels. Its export trade is of a miscellaneous nature and its import trade, though on the whole of the same nature, is characterized by the importation of large quantities of fresh and refrigerated meat and fruit. Glasgow, on the Clyde, first rose to importance, like Liverpool, with the growth of American trade. It has an excellent natural harbour, improved considerably for the accommodation of modern giant liners. There are abundant coal and iron deposits in the immediate neighbourhood of Glasgow, and this has led to the growth of various industries there. Owing to the varied nature of these industries it is difficult to single out a single industry as characteristic of Glasgow, except, of course, ship-building and marine engineering. The export trade of Glasgow, it is interesting to note, is 50 per cent. more in value than its import trade. Harwich, to the north-east of London, is engaged mostly in continental trade, and has a relatively small export business. Bristol, on the west, commands the Severn Valley and the thickly peopled region immediately east of it. Its export trade has, however, dwindled considerably in importance, but the import trade still continues to be large. Grimsby, on the eastern seaboard, is a minor port specializing in the export of coal and large iron and steel castings.

The principal seaports of France in the order of their importance are Marseilles, Le Havre, Rouen, Dunkerque, Bordeaux, La Rochelle, Nantes and Cherbourg. Marseilles, to the east of the Rhone delta, is said to be the only first-class port on the Mediterranean Sea. It commands the rich and productive Rhone Valley which enjoys the Mediterranean type of climate, and affords direct access by means of water-

Port of
Southamp-
ton.

Port of
Glasgow.

Ports of
Harwich,
Bristol &
Grimsby.

France:

Port of
Marseilles.

ways to the plains of northern France and Belgium. It is also well served by railways. Although it shares in the trans-Atlantic trade, its main business is with the Mediterranean region and the East. It is one of the principal *entrepôts* of the world, importing, among other things, large quantities of *wine, wheat, oil-seeds, sugar, coffee, hides, silk and pepper*. Le Havre, at the mouth of the Seine, is the principal centre of trade with America, and affords direct access to the Paris Basin by means of waterways. The Seine estuary, however, is dangerous to small craft, and constant dredging operations are necessary to keep the port open. It also serves more or less as an *entrepôt*, and imports *cotton, tobacco, wheat, animal products and coffee*. Rouen, on the Seine farther inland, stands in much the same relation to Le Havre as Manchester to Liverpool. The Seine has been well canalized for enabling large vessels to approach the port of Rouen direct, and this has resulted in the diversion of much of the trade of Le Havre to that port. Besides, Rouen at times imports large amounts of coal, and thus sometimes exceeds even Marseilles in the total tonnage of commodities handled. Dunkerque is the only North Sea port of France. Its hinterland comprises the coalfield region of Northern France—a continuation of the Great Belgian Coalfields—and the port serves the northern manufacturing towns like Lille, Roubaix and Valenciennes. The principal import is *wool* from South America and the chief items of export are *textiles, iron, beet sugar and oils*. The harbour has been deepened for the accommodation of large vessels, and the port is well served by a splendid network of first-class waterways. Bordeaux, on the Garonne, is the principal centre for the export of French wines. Its outport, Pauillac, is accessible to the largest vessels, and the river has been deepened for miles inland. La Rochelle, with its outport

of La Pallice which is accessible to large vessels, serves the middle regions of Western France. Nantes, on the Loire, became thoroughly useless as a seaport owing to the silting up of the Loire below it. Its outport, St. Nazaire, at the river-mouth, however, is accessible to large vessels, and the river has now been thoroughly dredged so as to enable moderately big vessels to reach Nantes. A ship canal also connects Nantes with Brest. St. Nazaire is well known for its ship-building yards. Cherbourg, on the English Channel, is well situated for trans-Atlantic trade.

Antwerp, on the Scheldt estuary, is the largest port of Belgium. It lies directly opposite the Thames estuary, and is much more advantageously situated than London for inland trade. It is connected by first-class waterways with the Meuse, Seine and Rhine. It serves not only as an outlet for Belgium, but also as the chief outlet for the principal manufacturing region of Germany. The quayside is said to be 28 miles long and the dock water area 1,334 acres. Ghent, at the confluence of the Scheldt and Lys, has been made accessible to vessels of moderate size by the construction of a ship canal. Ostend, on the west coast, and Bruges with its outport, Zeebrugge, are of much less importance. There is a large artificial harbour at Zeebrugge, and Bruges is connected with the sea by a ship canal.

Amsterdam and Rotterdam are the two chief ports of Holland. Amsterdam, on the IJ, near the shallow Zuider Zee, has been made accessible to the large modern vessels by means of the North Sea Canal. The port is well served by inland waterways, especially by the Merwede Canal. Amsterdam is the world's centre of diamond trade. Rotterdam, on the Nieuwe Maas, is the largest port of Holland. But the river is too shallow even at the mouth for large ocean steamers, and a ship canal—the 'New Water-

way'—now acts as the commercial highway for the port. Constant dredging operations are required for keeping the whole network of canals open to traffic. Much of the trade coming down the Rhine Valley passes through Holland, especially Rotterdam.

The largest and most important seaport of Germany is Hamburg with its outport, Cuxhaven. It is a North Sea port, and has risen to importance with the development of American trade. But in normal times it trades with the East as well, and buys much jute from India for its own jute mills. Bremen, with its outport of Bremerhaven, another important North Sea port, also trades with America and the East in normal times. Emden, another North Sea port, has risen to importance in recent times. Important Baltic ports of Germany are Lubeck, Travemünde, Stralsund, Stettin, etc. Most of the German ports, particularly those on the Baltic Sea, would be useless in winter were it not otherwise for the use of ice-breakers. And although Germany has been trying hard to develop her own ports, much of her foreign trade still passes through the ports of Belgium, Holland, France, Italy and Yugoslavia. The trade of the mining and manufacturing regions of western Germany passes, in normal times, mainly through Antwerp and Rotterdam.

Danzig, is a Baltic port and the main outlet and inlet for the Vistula Basin. The principal export of Poland through this port are *coal, timber, wood-pulp, paper, sugar and mineral oil*. But the Poles had, for some time past, been developing a port of their own called Gdynia outside Danzig.

Most of the important Norwegian towns are seaports. Oslo, at the head of the Glommen Valley, is the chief port and capital. It has a dock that can accommodate vessels of

medium tonnage only. Principal exports are *timber* and *wood-pulp*. Next comes Bergen on the southern part of the west coast. It is a centre of fishing industries, and its principal export is *timber*. Farther south lies the fishing port of Stavenger, and farther north is Trondheim, the third port of Norway, and in the far north stands Hammerfest. The principal seaport of Sweden is Goteborg (or *Sweden*, Gothenburg) on the south-west coast. The harbour is fairly deep, but not commodious. The situation of the port, however, is excellent; it is easily accessible from Great Britain, France and Germany. Malmo, at the southern end, may be said to stand face to face with Copenhagen, and is nearest to Germany; the bulk of the trade is naturally with Denmark and Germany. Stockholm, the capital, is the principal Baltic Sea port. The chief items of Sweden's export are *wood-pulp* and *paper* and *timber* (together about 50 per cent), and *metals* (about 30 per cent). The principal town of Denmark is Copenhagen, a free port now; it has a good natural *Denmark*, harbour, and is connected with the Swedish port of Malmo by an excellent system of train-ferry vessels. Copenhagen holds a most strategic position, controlling, as it does, the narrow entrances to the Baltic Sea. With the opening of the *Kiel Canal* (Germany), however, its strategic advantage has been greatly minimised. Aarhus and Aalborg are the chief ports on the east of Jutland. Odense is the chief port of Fyen. The principal exports of Denmark are *butter*, *cheese*, *bacon* and *eggs*.

The chief ports on the mountainous north coast of Spain *Spain*, are Bilbao and Santandar, noted for the export of good quality *iron ore*. These and other northern ports, however, are always under the possibility of being obstructed by bars, and constant engineering care is needed to keep them open. Cadiz and Huelva in southern Spain have the command

of the Guadalquivir Valley, although Seville on the Guadalquivir about 70 miles from the sea is the principal port of the region. The harbour of Cadiz, though accessible to the largest vessels, is not spacious enough for a large number of ships. The harbour of Huelva, on the other hand, is deep and spacious enough for 'a large fleet of the largest vessels', but obstructed by a shifting sand-bar at the mouth of the Rio Tinto. Constant dredging is required to keep Seville open to large vessels. *Wine* and *dried grapes* are the chief exports of this region. Malaga, Cartagena, Valencia and Barcelona are the principal ports of the Mediterranean coastlands of Spain. All these ports possess good natural harbours, rendered more suitable for modern vessels by engineering. The principal seaports of Portugal are Oporto and Lisbon on the west coast. Oporto, at the mouth of the Douro, is famous as 'the port-wine port'. A new harbour has now been constructed a few miles north of the river mouth for large vessels. Lisbon, the capital, is at the estuary of the Tagus and its admirable natural harbour is directly accessible for the largest ocean liners of to-day. It is the largest port of Portugal, exporting *cork*, *wine*, *fish*, *oranges*, *lemons*, etc., and importing *coal* and *manufactured goods* generally. Gibraltar, belonging geographically to Spain, is in British hands. It is a rock fortress commanding the gateway to the Mediterranean. Commercially it is important as an *entrepôt* and coaling station, and its docks have accommodation for the largest men-of-war in the British Navy.

The principal ports of Italy are Venice and Genoa. Venice, built upon a number of islets on the shore of the Adriatic Sea, is a natural port. Its entrance is guarded by a line of low sand islands. Two channels, one in the north and the other in the south, now made deep enough for the

largest vessels, allow easy access to the port. The hinterland of Venice comprises not only the eastern part of the northern plain, but also extends to the whole of the Po Valley, and Venice, which is connected by railways with Milan and Turin, handles much of the traffic of the Brenner railway. Venice has large ship-building yards as well. The position of Genoa on the gulf of that name is very interesting. Port of Genoa. It is flanked on the north, east and west by the Alps; a gap through the northern highlands, however, connects it by rail with Milan in the heart of the Po Valley. Railways along the coasts connect it with Pisa, Leghorn, Rome, Capua and Naples on the south-east, and with Savona and the Riviera on the south-west. From Savona a railway line runs direct to Turin in the Po Valley. Genoa has shipbuilding, iron, and cotton works. It has a fine natural harbour, which has been much improved and enlarged. The hinterland of Genoa includes, in addition to a large part of the Po Valley, southern Switzerland as well. Naples, in the middle of the southern half of the west coast, itself an important centre of Ports of Naples, Brindisi, Trieste, and Fiume. various manufacturing industries, has a deep and spacious harbour. Brindisi, on the south-east coast, was till lately a port of call for mail steamers from the East; but the service has been discontinued. Trieste, at the head of the Adriatic Sea, serves as an outlet for Austria, Hungary and Yugoslavia. Fiume, on the Adriatic, also annexed to Italy, serves mainly as a Yugoslav port.

Valetta, on the British island of Malta, is an important Malta. fortress and coaling-station and considerable *entrepôt*.

Piræus, the port of Athens, is said to be the fourth port in the Mediterranean and the principal port of Greece. Greece. It has a fine natural harbour. Salonika, another Greek port, serves also as an outlet and inlet for the trade of Yugoslavia

Patras, on the Gulf of Corinth, is famous for the export of currants; it is also a Greek port.

Leningrad, with its port, Kronstadt, is the chief port of the U S S. R., on the Baltic Sea. The harbour accommodation of Leningrad is not what it should be, and it is at Kronstadt that all large ships ride at anchor. A ship canal now gives direct access to Leningrad where all but the very largest vessels find a spacious anchorage. Riga, till lately the capital of Latvia and now in Russian hands, is also another important outlet for the U S S. R. Its harbour has been much improved, although its port for large vessels is *Ust Dvinsk*. Reval, the capital of Estonia until that state's recent incorporation into the Soviet Union, is another important outlet for Russia; the harbour has been deepened and extended. Russia's chief port on the Black Sea is Odessa. The chief Caspian port is Astrakhan. Another Caspian port is Baku, whence oil is sent by pipe-line to Batum on the Black Sea.

Africa.—The principal port of Egypt is Alexandria on the north-west fringe of the Nile Delta. It handles about 80 per cent of the import trade and 90 per cent of the export trade of Egypt. Port Said, at the entrance to the Suez Canal, is a considerable *entrepôt* and important coaling-station. Bulak is the port of Cairo. Port Sudan, on the Red Sea coast, handles about 80 per cent of the foreign trade of Anglo-Egyptian Sudan. Nearly two-thirds of its total export consists of *cotton and cotton seeds*; other exports are *gum, sesamum, skins, gold, and ground-nuts*. Massawa, on the Red Sea, is the port of the Italian colony of Eritrea; its chief exports are *hides and skins, and pearls*. Mogadiscio is the chief port of Italian Somaliland, whence *gums and hides* are exported. Berbera is the chief port of British Somaliland. Djibouti is the chief port of French Somali-

land; it is the terminus of the railway from Addis Ababa, Abyssinia's capital. Tripoli and Benghazi are the two ports of some importance in Libya. Oran, Tenes, Algiers, ^{Tunis} Bougie, Bona, and Tunis are the ports of Algeria and ^{and} Tunisia, which are under French domination. Chief ^{Africa} exports from these ports are iron, zinc, phosphates and cereals like wheat and barley. Most of these ports are open roadsteads, although some of them have now been provided with artificial harbours. Tangier, on the Strait of Gibraltar, and Mogador in the south, the port of Morocco, Casablanca, and Rabat are the well-known ports of Morocco. Durban is the principal port of Natal, S. ^{Morocco} Africa. It is in the south-east coast region of Africa, which receives its rain from the Trade Winds mainly in summer (Nov.-Feb.). The chief products of the region are sugar-cane, cotton, tea, arrowroot and black cattle. Coal is mined in the extreme north of the province, and Durban has become ^{South} an important coal-exporting port and coaling-station on the Cape Route. Large numbers of Indians have settled here, and large quantities of coal from Durban are exported to Bombay. Other important ports of South Africa are Cape Town, Port Elizabeth, East London, and the Portuguese port of Lourenco Marques. Cape Town has a fine natural harbour, which has now been much improved by the construction of an artificial one. It, too, is naturally a port of call on the Cape Route. Lourenco Marques also exports some coal to India. Dakkar, in French West Africa, a port of some importance, is the capital of French West Africa. Freetown, in Sierra Leone, is at the estuary of the Rokelle river and has a fine natural harbour. It is in ^{West} British hands. Other West African ports that can only be mentioned here are Accra, Porto Novo, Lagos, Port Noire,

Boma, Loanda, Benguela and Swakopmund, all of which are under one or other of the European powers

N. America.—Halifax, on the east coast of Nova Scotia, has an excellent natural harbour and is the principal naval station of Canada. It remains ice-free throughout the winter in most years. Charlottetown, in Prince Edward Island, is another Canadian port with a good harbour. St. John, in New Brunswick, is on the Bay of Fundy and possesses a fine harbour, which remains open all the year round; it is now connected by rail with Montreal, the principal centre of commerce in Canada. Montreal is on an island on the St. Lawrence some 180 miles above Quebec. This has contributed to its rapid rise and the consequent decline of the latter city. St. Lawrence has been well dredged for the passage of large ocean-going vessels to Montreal. It is now the largest grain port of Canada after Vancouver. Quebec, at the confluence of the Charles river with the St. Lawrence, is, like its rival Montreal, in command of the second manufacturing region of Canada. Toronto, on Lake Ontario, has a fine harbour, and is the capital of the first manufacturing province of Canada. Victoria at the south-east end of Vancouver Island has an excellent harbour, and serves as a considerable *entrepôt* on the west of the Dominion. Vancouver, at the mouth of Burrard Inlet, has a deep, commodious harbour, from which mail steamers run regularly to Alaska, Seattle, San Francisco, Hawaii, China, Japan, Australia and New Zealand. Prince Rupert, on Kai-En Island, is a terminus of the Canadian National Railways. The leading seaports of the U. S. A. in the order of importance are New York, New Orleans, Galveston, San Francisco, Philadelphia, Boston, Seattle, and Los Angeles.¹ New York is an admirable port.

¹ Chisholm's *Handbook*, p. 748

Like Bombay it is built upon an island, and has a splendid ^{part of} natural harbour, which has been turned into an ideal shelter ^{New York} for the largest ocean-going vessels. The Hudson river flows by it, and the gap thus caused to the north connects New York with Montreal in Canada. At right angles to this gap is another, the Mohawk Gap, which terminates at the confluence of Lakes Erie and Ontario. New York is, thus, directly connected by a splendid series of waterways with all the towns on the Great Lake System of N. America--with Duluth, Port Arthur (Canada), Chicago, Milwaukee, Detroit, Cleveland, Buffalo, and Toronto (Canada). The Delaware Gap, again, connects it with Philadelphia, the Susquehanna Gap with Baltimore, and the Potomac Gap with Washington. Down the narrow Hudson Valley alone run two canals and four main railways to New York. Of the total foreign trade of the U. S. A., New York alone handles ^{Part of} more than 40 per cent. New Orleans, on the Gulf of ^{New Orleans} Mexico, though not provided with a good harbour by nature, has been made accessible for large ships by means of a network of canals. It has direct railway connection with New York and Chicago. It has one of the largest hinterlands in the whole of the U. S. A., and trades in *gunny cloth, rice, bananas, cotton, molasses and sugar*. Galveston, also on the Gulf of Mexico, has grown in importance only recently, ^{part of} after the construction of a navigable channel across the bar ^{Galveston} at its entrance. It, too, has railway connection with all important centres. Large quantities of *cotton* are exported ^{Part of} from this port to Britain. San Francisco, Seattle, and ^{San Francisco, Seattle, and Los Angeles} Los Angeles are on the Pacific coast. San Francisco, in California, is at the head of a fine natural bay, which serves as an excellent harbour, and has a Mediterranean climate. Seattle, farther north, is in the region of the timber trade, and has a good natural harbour. Los Angeles, in California,

lacks a good harbour and may be described as an open roadstead; but an artificial harbour has now been constructed. It is a centre of American *oil trade*. Boston and Philadelphia are on the east coast. Boston, in the New England region, is a fine bay port, and is the great wool market of America. But the railway routes across the Alleghany Mountains being difficult Boston cannot compete with New York in handling the products of the hinterland around Chicago. Philadelphia, provided with a good harbour, is another centre of the wool trade.

S. America.—Buenos Aires, the largest city in South America, is the chief port of the Argentine Republic. But the harbour is not good and has to be kept open at great expense. Its principal exports are *meat, wheat, and dairy products*; principal imports, *coal, oil and manufactured goods*. La Plata, Bahia Blanca and Rosario are other important ports of the Republic. All of them are well served by railways, but none possess a good natural harbour. Rio de Janeiro, the chief port and capital of Brazil, has a safe and commodious natural harbour. Santos, farther south, is also a Brazilian port of growing importance. Sao Paulo, lying immediately behind Santos, is not actually a seaport, but an important centre of textile industries. All these towns are well served by railways. The chief exports of Brazil are *coffee, maté, meat and rubber*; chief imports, *oil, coal, wheat, machinery, etc*. Valparaiso, the port of Santiago, the capital of Chile, is situated on a beautiful bay; chief imports are *foodstuffs and manufactures*; chief exports, *nitrate of soda, copper and guano*. The ports of Antofagasta and Iquique, however, handle the greater part of the exports.

Australia.—Sydney, the capital of New South Wales, is the largest town and seaport of Australia. Its harbour, Port Jackson, is one of the finest natural harbours in the

world. Brisbane, at the head of the estuary of the river of that name is the capital and chief port of Queensland, Australia. It is accessible to large vessels. Fremantle, on the west coast, is the port of call for mail steamers; mails are landed here and sent by train or aeroplane all over the continent except North Australia. Hobart, on the south of Tasmania, upon the river Derwent, is the capital of that *Tasmania* island and a port of some importance. The Derwent is navigable by the largest vessels. But the chief port of Tasmania is Launceston on the north at the head of the Tamar estuary.

STUDIES AND QUESTIONS

1. Describe the Suez Route with the object of showing its commercial value. (C. U., B. Com., '24).

2. Discuss the relative advantages and disadvantages of the Suez and Panama Routes from Western Europe to Eastern Asia. Large quantities of jute goods are exported from Calcutta to the Pacific ports of South America. What route do the ships follow for this trade, and why, (C. U., B. Com., '34).

3. "The opening of the Panama Canal has brought about many changes in the ocean routes, but by no possibility can it have such an important effect on the commerce of the world and lead to such rapid expansion of trade and traffic as was brought about by the opening of the Suez Canal."—Discuss. (C. U., B. Com., '26)

4. "The traffic through the Panama Canal has increased with surprising rapidity in recent years." State briefly the factors that have led to the improvement. What are the principal commodities that pass through this canal? What are the main defects of this route to the East and how are these going to be remedied? (C. U., B. Com., '27).

5. Discuss the importance of the Suez Route to India's external trade. How will this trade be affected if the route be temporarily closed? (C U., B Com., '36).

6. How does the Cape Route compare with the Mediterranean from India to Europe. In what way will India's trade with Western Europe be affected if the latter route is blockaded during a war? (C. U., B. Com., '39).

7. State the necessary conditions for the development of good seaports. Apply these considerations to any of the following. (a) Montreal, (b) Fremantle, (c) Shanghai, (d) Buenos Aires, (e) Trieste. (C. U., Inter., '25-6)

8. Describe the position of any four of the following ports and discuss the parts they play in the commerce and industry of the country they serve: (a) Rotterdam, (b) Yokohama, (c) Genoa, (d) Galveston, (e) Buenos Aires. (C U., Inter., '28)

9. What do you understand by the hinterland of a port? Illustrate your answer by reference to a few ports in the different parts of the world (C U., Inter., '34)

10. State the situation and describe the reasons for the importance of any five of the following (a) Buenos Aires, (b) Danzig, (c) Durham, (d) Chicago, (e) Hobart, (f) Sydney, (g) San Francisco, (h) Vancouver, (i) Yokohama (C U., Inter., '31).

11. State the situation and mention the geographical circumstances giving importance to any five of the following. (a) Glasgow, (b) Danzig, (c) Mosul, (d) Singapore, (e) Hong Kong, (f) Durban, (g) Los Angeles, (h) Buenos Aires, (i) Brisbane. (C U., Inter., '26).

12. "The importance of a port depends upon the extent and the productiveness of its hinterland"—Discuss. (C U., Inter '40)

13. Account for the importance of any four of the following (a) Harbin, (b) Colombo, (c) Manchester, (d) Chicago, (e) Warsaw, (f) Minneapolis (C U., Inter., '33),

14. What factors make for the successful development of a river port? Give a few conspicuous examples (C. U., Inter., '34).

15. Indicate clearly the geographical circumstances giving importance to the following.—(a) Hamburg, (b) Lisbon, (c) Brindisi, (d) Alexandria (e) Durban, (f) Sydney, (g) San Francisco. (C U., Inter., '45).

**SHORT STUDIES IN
ECONOMIC & COMMERCIAL
GEOGRAPHY**

PART—II

CHAPTER I

AUSTRALIA AND POLYNESIA

AUSTRALIA

Position and Size.—Australia is the largest island in the world and smallest of the continents except, of course, the barren snow-covered territory of Antarctica. Even including the islands of Tasmania, New Guinea and New Zealand and the numerous islands that lie scattered over the vast open expanses of the Pacific Ocean,—a group often described collectively as the continent of Oceania—it is perhaps the smallest continent. The area of Australia proper, including Tasmania, is 3 million square miles, i.e., four-fifths that of Europe. The coast-line is remarkable for its general compactness; good harbours are, therefore, lacking, and to this has partly been attributed the delay in opening up the interior. Certain outstanding features relating to its position must be noted: the continent lies entirely in the *Southern Hemisphere* far away from all other continents; the *Tropic of Capricorn* passes through the northern third of the continent, so that while one-third of the territory lies in the Tropics, the southern two-thirds is in temperate latitudes. And here we must guard against a possible misconception: although in the Southern Hemisphere, Australia does not lie at the fringe of the Antarctic Circle; in a topsyturvy world it would occupy the position of the Sahara Desert, and the island of Tasmania would very nearly touch the northern fringe of Spain, because the positions occupied by them in the Southern Hemisphere correspond to those of the Sahara and northern Spain in the other. The longitude of 135°E. is the central meridian of this island continent. The Commonwealth of Australia is almost coincident with

Australia
and
Oceania.

Area.

Coastline.

Tropical
and
Temperate
parts

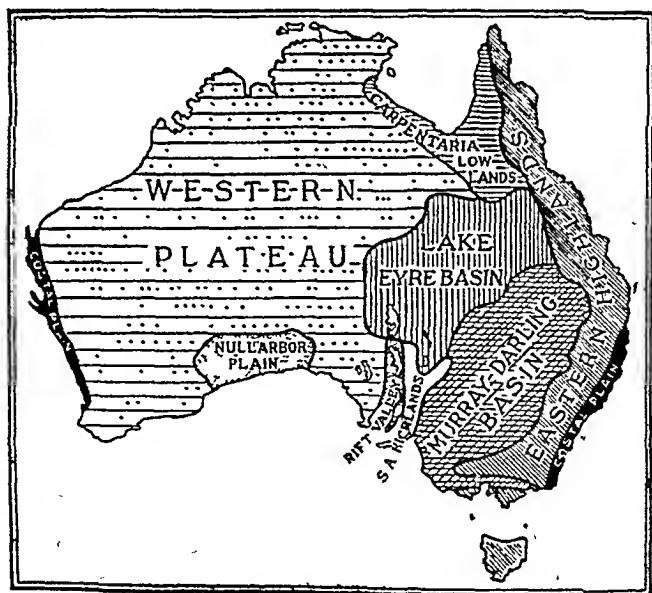
Antipodes.

Central
Meridian

the Continent of Australia. The Commonwealth is a British Dominion

Physical Features.—Topographically considered, Australia can be divided into three natural regions:

(a) The Western Plateau Region, consisting of a vast mass of ancient metamorphic rocks. The average elevation of the plateau, however, is variously stated to be between 600 and 1,500 feet, or between 1,000 and 2,000 feet above sea-level. This huge block covers more than half the total area of the continent, sometimes descending direct into the sea, and at other times leaving marginal spaces for narrow coastal plains.



THE PHYSICAL REGIONS OF AUSTRALIA

(b) The Central Lowlands, formed by the *Carpentaria Lowlands* in the north, *Lake Eyre Basin* in the middle,

and Murray-Darling Basin in the south. The South Australian Highlands, consisting of a series of hills running in a general north-south line, form an interruption in the south-central plains of the Murray and Darling. To the west of the Highlands is the *Rift Valley* of Australia.

(c) The Eastern Highlands, formed by a series of block mountains and possibly by some pre-Tertiary fold mountain ridges as well. The slope of these mountains is from east to west. The western slopes form the great grass-land region of Australia, and the famous Darling Downs of Queensland are only a part of this important region. The whole range is known as the 'Great Dividing Range', although the different parts have different names such as *Australian Alps*, *Blue Mountains* etc. Towards the south these ranges curve in a westerly direction, throwing out parallel ranges to the south. In the northern part the ranges directly reach to the sea, while in the southern part they leave space for an extremely narrow but very important *coastal plain*. Since the continental shelf upon which the mainland of Australia stands is also the platform, geologically, of the mountainous island of Tasmania, it may be regarded as a detached mass of the Eastern Highlands¹

Australia is singularly deficient in large rivers. Those of the north coast like the *Fitzroy*, *Roper*, *Mitchell*, *Flinders* and *Victoria* are all tropical rivers fed by the periodical (monsoon) rains and all of them lack a steady supply of water. The principal river of the west coast is the Swan, 200 miles long, at the mouth of which stands the city of Perth. Most of the permanent rivers, however, are in the east and south-east, the Trade Wind region of Australia,

Rivers and
Lakes.

¹ The island of New Guinea to the north of the mainland also stands on the same continental shelf, which is separated by a deep sea line from the Asiatic shelf on the one hand and that of New Zealand on the other. Most of the East Indian islands belong to the Asiatic shelf

where the rainfall is heaviest and where the rivers are fed by the melting snow of the Eastern Highlands. The *Fitzroy*,¹ *Brisbane*, *Hawkesbury*, *Hunter*, *Clarence* and, above all, *Murray* and *Darling* are the principal rivers of this region. The main stream of the Murray is 1,300 miles in length; rising in the south of the Eastern Highlands, it flows in a west and north-west direction until deflected to the south by the Flinders Mountains lying ahead; after turning to the south it drains into the sea through *Lake Alexandrina*. The source of the Darling is more than 2,300 miles from the sea; it drains into the Murray with its many affluents from a north-easterly direction. Other important tributaries of the Murray are the *Murrumbidgee* and the *Lachlan*. Several streams of Australia like the *Diamantina*, the *Cooper's Creek* and the *Eyre's Creek* drain into *Lake Eyre*, in the heart of the Central Lowlands, but in the dry season these generally dry up, leaving the lake basin an unhealthy swamp. The surface of the Lake Eyre Basin is below sea-level.

Geology and Minerals.—The underlying geological structure of Australia is, comparatively speaking, very simple, and the close correlation between its surface topography and geological structure is obvious. The Western Plateau region is composed of ancient metamorphic (crystalline or old, hardened sedimentary) rocks, resistant to denudation. As we have noted in an earlier chapter (p. 9), the metalliferous minerals tend to be associated with these rocks. The widespread occurrence of gold in the Western Plateau region is, therefore, not at all surprising; the three important gold fields of this region are those at *Kalgoorlie*, *Coolgardie* and *Cue* (Murchison goldfield). Gold is plentiful in the eastern parts as well, since the Eastern Uplands, though

¹ There are two rivers of that name (Fitzroy) in Australia

perhaps of more recent origin (probably Palaeozoic or Cambrian &/or Mesozoic or pre-Tertiary), are also formed by crystalline or metamorphic and other hard rocks. The famous goldfields of *Ballarat* and *Bendigo* are in this region. Other important metallic minerals are copper (Queensland, Tasmania, South Australia and New South Wales), tin (Tasmania and the eastern states), silver (Queensland, New South Wales, Tasmania), lead (Queensland, New South Wales, Tasmania), zinc (New South Wales), wolfram (Queensland), and iron (generally distributed). Of all the iron deposits those of the famous *Iron Knob*, a hill of iron ore in South Australia, is the most important. The Central Lowlands of the continent are formed by young, soft, sedimentary rocks (p. 9) of the post-Tertiary or later Cainozoic age (probably Miocene &/or Pliocene). Non-metallic minerals like coal and oil usually tend to be associated with young, sedimentary rocks,¹ and thus on the flanks of the Eastern Highlands in the region of Queensland and New South Wales occur large deposits of coal. The most important coal basin is near *Newcastle*, New South Wales. But no oil has as yet been discovered in Australia, and considering the age of the rocks it seems highly improbable that oil will ever be found there. The young, soft rocks, however, usually furnish a soil and a topography suitable for agriculture, but unfortunately the Australian lowlands are climatically very dry as the Great Dividing Range effectively cuts off the rain-bearing Trade Winds from the east. Yet this unfortunate state of things has been compensated for to some extent by the folds in the underground rocks, enabling them to form basins containing water. Artesian wells can, therefore be bored for providing water for sheep and cattle, though not for cultivation as the

Non-metallic minerals.
coal.

No oil in Australia.

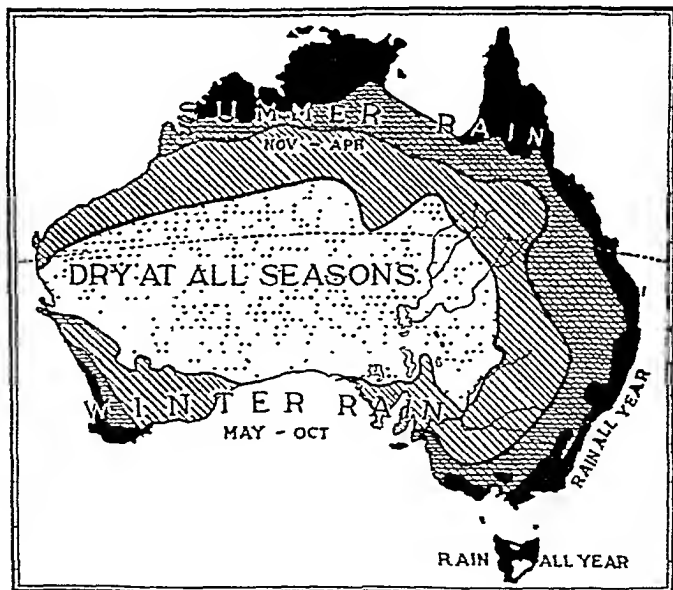
Climate the great hindrance to agriculture.

Artesian Wells.

¹ Mineral oil occurs mostly in the margin of Alpine fold mountains.

water is generally too saline for plants. Thus considerable parts of the dry region of Australia have been transformed into large cattle-and sheep-rearing areas. There is, however, one great geological puzzle in Australia as to the future supply of underground water: some are apprehensive of its exhaustion in no very remote future, while others believe in the constant renewal of the supply by the rain that sinks into the ground every year in other parts of the continent.

Climate.—Australia is a topsy-turvy world, lying south of the Equator, where it is mid-winter in July and blazing hot in January. The Tropic of Capricorn, we have seen,



RAINFALL IN AUSTRALIA

passes through the heart of the continent. So during the summer months (Nov.-April) the sun shines vertically

almost over the centre of the mainland, where the average slide temperature soars as high as 80°F. , and in some parts well over 90°F. All over the enormous central territory, and particularly in the north-west coast, low pressure centres of varying barometrical gradient are formed accordingly, to which the cool, rain-bearing winds flow from the Indian Ocean to the north and west. This is the North-west Monsoon of Australia. The northern fringes of the north-western coastlands receive a good rainfall—sometimes as much as $40''$ annually; but it is progressively light towards the interior, the greater part of which lies beyond the monsoonal range. Nearly the whole of the east coast lies in the belt of the South-east Trade Winds; but the Great Dividing Range cuts off these winds, so that only the narrow coastal areas receive a good rainfall ($40''$) all the year round. The vast interior of the continent is thus exceedingly dry at all seasons. The east coast, especially the southern half of it, has a marine climate. The southern coast also remains dry during the hot season, because the passage of the westerlies (N. W. Anti-Trade Winds) shifts too far to the south to blow over the mainland, although they bring rain to Tasmania. The southern fourth of Australia is, however, not so hot during the summer months as the northern three-fourths, partly because of their relative distance from the Tropic of Capricorn and partly because of occasional cool winds from the Antarctic. As the sun moves farther and farther towards the Tropic of Cancer during the Australian winter (May-Oct.), the earth's thermal equator begins to shift to the north, and because of the resulting fall in temperature over the greater part of the continent, high pressure centres are formed in the interior, particularly in the south-east. But the northern fourth of the continent keeps relatively hot with an average temperature of 80°F. Obviously the heavy air over the heart of Australia will flow

Conditions
in Hot
Season.

Conditions
in Cold
Season

towards the hotter north, and owing to the general northerly swing of the world's wind systems during this season, the entire north actually comes under the influence of the S E Trade Winds which blow, except in Queensland, from the dry interior. These dessicating winds bring no rain to the north. The southern part at this season comes in the belt of the N. W. Anti-Trades, which thus bring winter rain to this region. This is, therefore, the Mediterranean region of Australia. The rainfall is fairly good, varying, as it does, normally between 40" and 20" annually. Tasmania,



THE CLIMATIC REGIONS OF AUSTRALIA

always in the westerly wind belt (Anti-Trade belt), has rain all the year as do the east coast of the mainland owing to the Trade Winds from the Pacific.

Natural Vegetation.—Combining all these data we find that Australia can be divided into at least six climatic regions: Six Natural Regions.
 (a) there is, first, the *Tropical Climatic Region* in the north and north-east with a climate of the Sudan type. The coastal areas are generally fringed with mangrove swamps; farther inland there are Monsoon forests (evergreen), which eventually pass into rich grasslands or savannas. (b) In the heart of the continent prevails the *Hot Desert Climate* with its characteristic spiny grass and scrub. (c) The *Mediterranean Climate* prevails in the south, especially along the south-eastern and south-western coasts, where fine forests are sometimes seen. (d) South of the tropical grasslands and covering the greater part of the Murray-Darling Basin occurs the *Temperate Grassland Climate*, in the wetter parts of this region tall trees are found. (e) Along the southern half of the eastern seaboard lies the region of the *Eustralian Climate*, where the natural vegetation is eucalypt forest. The Eustralian type of climate is closely similar to the China type, but characterized by milder winter and rainfall at all seasons. (f) The island of Tasmania has a *Cool Temperate Oceanic Climate* like that of the British Isles.

The continent of Australia is believed to have been isolated from the rest of the world long before any other land had thus been separated, and so has a characteristic Typical Vegetation.
 flora and fauna of its own. Amongst the plants particularly characteristic are the several varieties of the eucalyptus tree; the 'mallee scrub' covering vast areas of the Desert Region is a stunted eucalyptus tree with small leaves that are arranged vertically; in the wetter parts—especially of tropical Australia—on the contrary, exceedingly tall varieties of the eucalyptus plant, yielding very hard wood, not eatable by white ants, grow luxuriantly. In the Mediterranean regions the karri and jarrah forests are very important, and on the hill slopes generally there are the fine blue gum,

forests The '*mulga*' is a stunted acacia plant, occurring extensively like the '*mallee*' in the dry interior. The tall Kangaroo grass and various other herbs like the salt bush, notable for their capacity to stand long drought, are nutritious food for sheep. But the Australians have upset the balance of the plant world by the introduction of the succulent prickly pear to provide fodder for sheep and cattle in the drier parts; this has now resulted in the invasion of wetter regions by this wild plant.

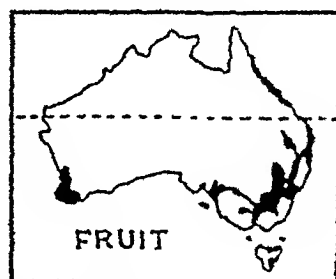
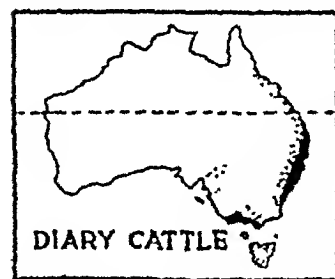
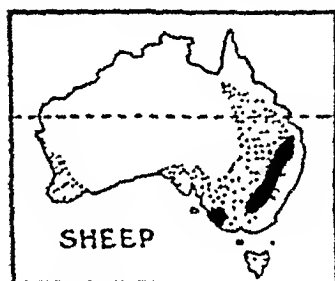
Animal Life.—But even still more characteristic are the animals of Australia. The several varieties of the Kangaroo, the platypus, the emu, the dingo and other animals and birds are unknown in any other continent. Some of these animals, particularly the kangaroo, yield furs of some value, but the value is not sufficient—at least so we are told—to cover the loss they inflict by destroying grasslands and orchards. The fact is that the barbarous colonists have almost wiped out the land mammals of Australia for obtaining the fur. Animals from Europe have now been introduced, especially the sheep and the rabbit. There being no wild animals except the dingo to prey upon them, they have multiplied at an enormous rate. And although the increase in number of the sheep has been salutary to Australia's wool industry, the rabbits have grown to be a serious menace to pastures and orchards, and in Western Australia an enormous wire fence, 2,000 miles long, has been put up to keep them out. This rabbit nuisance is an example of how the balance of the native animal life of a country is sometimes upset by the introduction of foreign animals.

Primary Production.—Although Australia as a whole is rich in minerals, primary production is a factor of major importance in the national economy of the Dominion.

The leading agricultural products are wheat and fruits. There are two major wheat belts—one occupying the south-western Mediterranean region and the other extending from the south-eastern Mediterranean region through the temperate grasslands (Murray-Darling Basin) to the eastern fringes of the wetter tropical lands. The highest concentration of wheat is, however, to be found in this second belt. Various tropical fruits, including *banana* and *pineapple*, as well as the tropical *sugar-cane*, are largely grown in

Wheat Belts.

Fruit Regions.



*Queensland in the north-east, especially along the east coast of that state. But more important from the point of view of national economy are the Mediterranean fruit-growing regions of Victoria, South Australia and Western Australia. Deciduous fruits like *peaches*, *apricots* and *apples* are grown chiefly in the northern parts of the temperate grasslands,

while farther south are found citrus fruits and plants like *oranges*, *lemons* and the *vine*. Wine is produced from the vine, but does not form an important item of export; but peaches and apricots are exported, after drying and tinning; apples are also exported, chiefly from Victoria and Tasmania. Besides agriculture, cattle farming and sheep rearing are very important. On the tropical grasslands of the north are kept a limited number of beef cattle; but of much more importance are the cattle lands of the south; dairy-farming is most extensively carried on in Victoria and the well-watered south-east coastlands. Australia's leading export is wool; there are, we are told, no less than a hundred million sheep in the continent, and most of these are confined to the two great sheep-rearing belts of western and eastern Australia; the largest concentrations of sheep are in the temperate part of the continent and the south-eastern Mediterranean region; in the west the sheep-rearing belt almost coincides with the south-western Mediterranean land, although lesser concentrations are to be found along the whole of the west coast.

Population.—The aboriginal Australians are allied to the pre-Dravidian races of Southern India, the Vedda of Ceylon, the Sakai of the Malay Peninsula and a few other races of Oceania. Whether they were ever very numerous we cannot positively say; but it is now definitely known that they came very near total extinction in the hands of the first white settlers from Europe. Their total number is now estimated at 60,000. Driven out of the more fertile, and well-watered regions, most of them now live in the north and west 'as do also the 20,000 half-castes'. The earliest British settlers were convicts sentenced to penal servitude for life; the first batch consisting of 850 men and women, mostly hardened criminals, arrived at Botany Bay, New South Wales, in 1788, and to them fell the task of

developing the resources of the continent. No wonder that the aborigines should be cruelly hunted down like game animals. Came the Napoleonic Wars and the Industrial Revolution with the consequent maladies of unemployment, food shortage, riot and what not, and the Government of Great Britain, eager to be relieved of the hungry millions, persuaded them to emigrate to Australia and other parts of the Empire. The discovery of gold in the eighties of the last century subsequently led to a gold rush which eventually culminated in extensive settlement. The present population is a little over 6 million with an average density, in an area of 3 million square miles, of only 2 to the square mile. Nearly all the settlers are from the British Isles. Turning to the distribution of population we find that, more than half the total population is concentrated in the capital cities such as Melbourne, Sydney, Perth, Adelaide and Brisbane. The density of population is nowhere high except in Victoria. The basin of the Murray-Darling is fairly densely settled especially in the wetter South and East. This uneven distribution of population is due to economic, political and physical factors. The central part of Australia is a desert and as such unfit for human habitation. The Northern territory is incapable of close settlement by the white races due to climatic difficulties. This part of Australia can be developed economically, if Asiatics are allowed to settle here. But the "*White Australia Policy*" of the Government of Australia as a result of which the introduction of all coloured labour has been prohibited stands in the way. It is estimated that Northern territory, if developed, can support more than four times the population of Victoria. But the average European settler will prefer to stay in the non-tropical parts of the continent, until the latter becomes so far saturated with population that the pressure to go elsewhere is much greater than at present. So the

Labour
question &
White
Australia
Policy'

Total
population
and density.

Distribution
of
population

chances of the Northern territory being filled up by European immigrants is very remote. This region is likely to remain economically undeveloped for a long time to come for want of labourers.

Communications.—The surface of Australia is, on the whole, fairly level, consisting, as it does, of vast plateaus and extensive plains. Railway communication would, therefore, be easy were it not for the Great Dividing Range which acts as the chief obstacle to communication with the interior. Another difficulty standing in the way of establishing through communications is that different railway systems already existing are on different gauges. These systems have been joined up actually, but through communication has not yet been established. Since the continent offers suitable conditions for road-making, extensive highways and motor tracks are now being built all over the territory. Trans-continental airways have also been developed, and the continent is now connected with the vast outer world by means of trans-oceanic airways. The principal air services of Australia are the (a) Melbourne—Hobart Service, (b) Cootamundra—Charleville Service, (c) Perth—Adelaide Service, (e) Cloncurry—Normanton Service, and (f) Brisbane—Darwin—Singapore Service which is connected with Imperial Airways to London.

Foreign Trade.—Australia is a vast territory that is very thinly populated. Naturally, therefore, enormous areas lie undeveloped. It is still essentially a pastoral and agricultural country, and the industries it has developed are mainly occupied with the exploitation and utilisation of pastoral and agricultural produce. Consequently, the export of Australia consists chiefly of its natural products and the bulk of the imports consists of manufactured articles. The foreign trade of Australia may be studied from the following tables:

The Exports of Australia¹

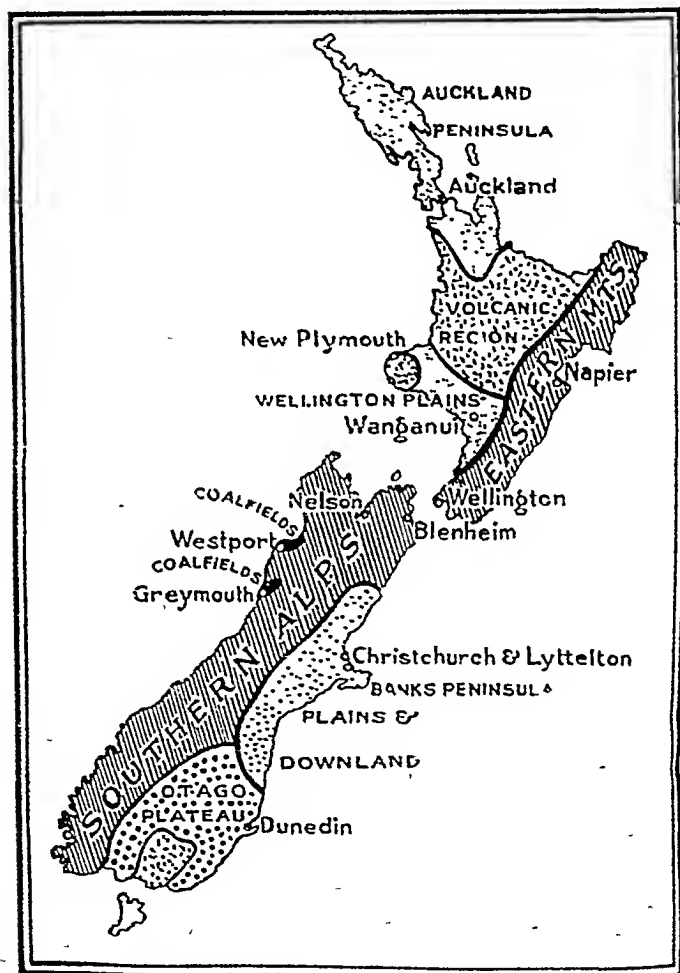
Commodities	Percentage of Total Value		
	1909-13	1921-25	1931-35
Wool	43	42	39
Wheat & Flour	14	24	20
Meat .. .	6	4	8
Butter .. .	5	7	11
Hides & Skins	6	2	3
Fallow .. .	2	2	—
Lead .. .	2	3	—
Spelter .. .	3	—	—
Fruit .. .	—	—	4
Sugar .. .	—	—	2
Others .. .	19	16	13
Total ..	100	100	100

The Imports of Australia¹

Commodities	Percentage of Total Value		
	1909-13	1921-25	1931-35
Textiles .. .	18	22	20
Machinery .. .	7	5	6
Iron & Steel .. .	8	5	4
Other metals .. .	9	3	—
Paper .. .	2	4	4
Chemicals .. .	3	3	5
Sacks .. .	2	3	3
Oils .. .	2	—	—
Timber .. .	3	2	2
Tea .. .	2	2	3
Spirits .. .	2	—	—
Cars .. .	—	6	2
Rubber .. .	—	2	2
Petrol .. .	—	4	3
Tobacco .. .	—	2	—
Other oils .. .	—	—	2
Other food .. .	—	2	—
Others .. .	42	35	35
Total ..	100	100	100

¹ Compiled from Stamp, *A Commercial Geography*.

Island this backbone, known as the Eastern Mountains runs by the east coast, and in the South Island, where



THE NATURAL REGIONS OF NEW ZEALAND.

has been given the name of Southern Alps, it is near the west coast. Bordering the Eastern Mountains on the west and covering a large part of the central region of the North Island is an extensive area of volcanic rocks. In the south-east of the South Island lies the Otago Plateau. Many of the peaks of the Southern Alps are over 10,000 feet above sea-level and are always covered with snow. The two major plains of New Zealand are the Canterbury Plains of the South Island and the Wellington Plains of the North Island; to these may also be added the well-watered rolling country of the Auckland Peninsula. There are numerous rivers in New Zealand, but most of them are too rapid for navigation. The *Molynca* or *Clutha* is the largest river of the South Island; but the chief navigable river, the *Waikato*, is in the North Island. The whole of the Dominion, except perhaps the extreme northern end, lies, like the British Isles, in the Westerly Wind Belt. But New Zealand is nearer the Equator than the British Isles, and therefore, enjoys a warmer and sunnier climate. Unlike Australia, New Zealand never experiences drought. We can distinguish six natural regions in New Zealand:

Climate

Natural Regions.

(a) The Southern Alps Region, occupying the western parts of the South Island. Owing to abundant precipitation (over 70") the mountains are—unless, of course, too high—covered with thick forests, little exploited as yet. Rainfall, however, is progressively less towards the east. Mountain pastures lie scattered over the whole region, especially in the drier parts to the north-east. Valuable minerals such as gold, copper, coal and greenstone are also found in this region; but mining industries are still in the infant stage.

(b) The South Island Grassland Region, covering not only the Otago Plateau and the Canterbury Plains, but also the Banks Peninsula in the east, and Downland in the

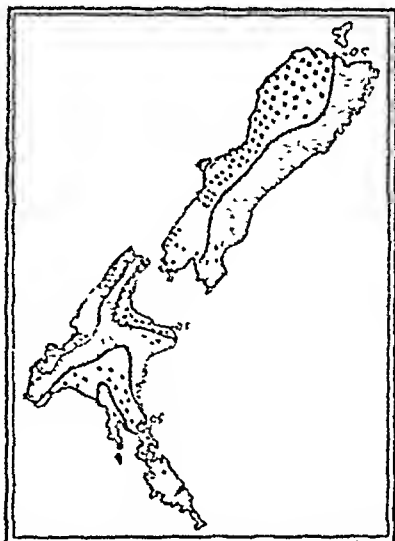
north of the Plains; the two small strips of coastal land at the northern end of the South Island may also be included in this region. It is the chief seat of New Zealand's pastoral and agricultural industries;—even on the comparatively poor Otago Plateau sheep-rearing and agriculture are of prime importance. The climate being, on the whole, similar to that of the British Isles, various English grasses have been introduced in this region and elsewhere for feeding the sheep. Sheep are kept for both wool and mutton. The chief agricultural products of this region are oats and wheat, the former associated naturally with the colder, poorer lands mainly of the Otago Plateau and the latter with the warmer, richer lands of the Canterbury Plains and the small coastal strips.

(c) The Eastern Mountains Region of the North Island. Although the mountains here are lower, the whole region is topographically more varied. The Eastern Mountains, in contrast to the Southern Alps, lie in the drier side of the North Island. Unlike the latter, again, this region abounds in pastures suitable for sheep, and is another important wool-and mutton-producing region of New Zealand.

(d) The Wellington Plains, to the south of the volcanic region, have a large concentration of sheep and a fairly large number of cattle, and are among the chief dairying regions of the Dominion.

(e) The Volcanic Region, to the north of the Wellington Plain and east of the Eastern Mountains, occupies the heart of the North Island. Hot springs and geysers abound and there are many volcanoes, some still active but most of them now extinct. The soil is poor and dry except in the south where small concentrations of sheep are seen.

(f) The Auckland Peninsula, to the north of the Volcanic Region, occupies the northern parts of the North Island. This is the only region of New Zealand, except a few of the smaller Pacific islands, which has a warm climate akin to the Mediterranean type. The forested parts of the Peninsula formerly yielded much Kauri-gum, prepared from the resin of the Kauri trees. These are the only forests of New Zealand that have been thoroughly exploited. Grass suitable for cattle naturally grows here, and it is, therefore, one of the principal dairy-farming regions of the Dominion. Mediterranean fruits and plants like the vine, orange, and lemon are also cultivated here; but wine is rarely distilled. Some minerals are found, chiefly gold.



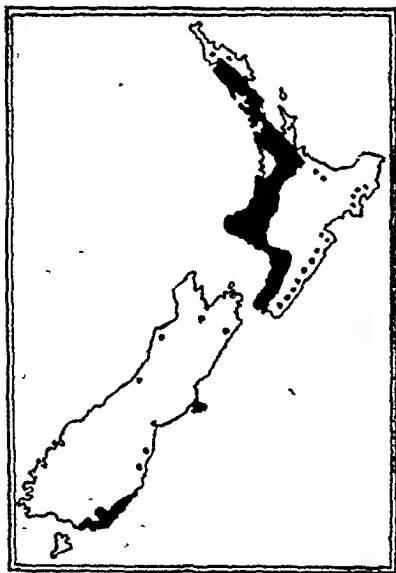
THE CONCENTRATION OF SHEEP
IN NEW ZEALAND

The total population of the Dominion is about a million ^{People} and a half, the bulk of the population is of British descent, the aborigines, called the Maori, numbering some 70,000. These latter are a tall, slenderly built, intelligent stock of the Polynesian races, and are characterized by mesaticephalic features generally.

The capital of the Dominion is Wellington at the ^{Towns of} southern end of the North Island on the Cook Strait which ^{New} Zealand

reaches the city in the form of an inlet forming an excellent commodious harbour; its port is Port Nicholson. The total population of the city and its port, according to the census of 1935, is 148,000. Westport and Grey-mouth, on the north-western coast of the South Island, serve the coal areas of the Southern Alps Region. Dunedin, on the east coast of the South Island, with a population of 89,000, is the port of the Otago Plateau. Christchurch, with its port of Lyttelton, is the chief city of the Canterbury Plains; it has a population of 132,000. Nelson, at the head of the

Tasman Bay, serves the small sheltered valley on the west of the main mountain chain of the Southern Alps. Blenheim similarly serves the valley on the east of that chain. Both the towns—Nelson and Blenheim—lie at the northern end of the South Island. Auckland, on a narrow isthmus of the peninsula of that name, is, with a population of 223,000, the largest town of New Zealand, it is a calling-station for steamers



DAIRY-FARMING REGIONS
between Australia and America

New Zealand is essentially a pastoral and agricultural country, and its prospects of industrial development are still

very remote. But it has, for its size, large potential water-power resources, which, if and when fully developed, would supply 1,750,000 horse-power; at present, however, something like 950,000 h.p. is being utilised. The principal installations are the Lake Coleridge station in the neighbourhood of Christ-church, the Waikato River Works near Hamilton and the Mangahoe installation near Wellington. More than 80 p.c. of the exports of the country consists of the four principal its—wool, mutton, butter and cheese. About three-quarters of the total export trade is with great Britain, which, in its turn, supplies nearly half the total imports of New Zealand. A preferential tariff in favour of the United Kingdom has been in force since 1903. The nature of the trade is unbalanced, the exports being usually

Exports of New Zealand¹

Commodities	Percentage of Total Value		
	1909-13	1921-25	1931-35
Wool ..	40	26	22
Frozen Meat ..	21	21	25
Butter & Cheese ..	18	36	32
Sheepskins ..	3	2	2
Tallow ..	1	2	—
Agricultural produce ..	—	—	2
Others ..	14	13	17
Total ..	100	100	100

Imports of New Zealand²

	Percentage of Total Value		
	1924	1926-30	1931-35
Foodstuffs	12.2	14.6
Raw Materials	14.3	15.4
Manufactures	73.5	69.1

¹ Compiled from Stamp, *A Commercial Geography*, p. 287.

² Compiled from Chisholm's *Handbook*, p. 824.

in excess of imports. This is explained by the fact that while the exports consist almost solely of raw materials of lesser value, the bulk of the imports consists of manufactured goods of high value.

The principal foodstuffs are sugar, tea and fruits; principal raw materials, tobacco and cigárs, petroleum and oils and fertilisers; chief manufactures are textiles (cotton, wool and silk goods), apparel, cars, machinery, paper and books, iron and steel, rubber tyres and tubes, and chemicals and drugs

THE ISLANDS OF THE PACIFIC

NEW GUINEA, with an area of nearly 300,000 sq. miles, is the second largest island in the world after Australia. Its western portion, comprising about one-half of the total area, is in Dutch hands. The southern portion of the eastern half, together with the Louisiade Archipelago, is a British Crown Colony now officially known as the 'Territory of Papua' and administered by the Commonwealth of Australia. The north-eastern portion, known officially as New Guinea, was formerly in German hands, but has been placed under the control of Australia by a mandate of the League of Nations. The whole island lies in the Equatorial region and receives abundant rainfall, with the result that the lowlands are covered with hot wet evergreen forests. The interior is a tableland and the narrow south-eastern extremities are traversed by mountain chains—the *Owen Stanley Range*—rising to altitudes of 13,000 feet and more in some places. The tableland of the interior, much of which still remains unexplored, is said to be covered with dense tropical grasslands. The *Fly* and the *Sepik* are the two great navigable rivers, serving as natural

highways to the interior. The chief agricultural products of the island are bananas, yams, sugar-cane, cocoanuts, taro and some tobacco. Some minerals are found, notably gold. The trade is small; the chief exports are copra, gold, rubber, trepang and pearl-shell. The gold is alluvial and worked by Europeans, mainly in the Louisiade Archipelago. Port Moresby, the capital and port of Papua, has regular ocean communication with Australia. The natives belong to what for want of a better and more precise term is called the Melanesian race. They are, despite racial intermixture, basically of Negrito descent, usually short, dark, and long-headed, and perhaps of an indolent disposition. The great obstacles to the development of the island are its climate and the scarcity of labourers, to which we must add the not always harmonious interests of the Dutch, German and British planters. Otherwise the island offers opportunities for development as much as Ceylon and Jamaica.¹

MELANESIA, meaning 'Islands of the Blacks', is a name given to several groups of small islands lying to the east and south-east of New Guinea. These are grouped under the names of Bismarck Archipelago, New Caledonia, Solomon Islands, New Hebrides &c. Most of these islands are of volcanic origin and bordered by coral reefs; the general nature of the surface relief is characterized by the presence of mountains. The climate is of the Equatorial type, but much tempered by oceanic influences. The natural products however, are more of a tropical nature than equatorial, represented in the main by bananas, yams, cocoanuts, sugar and cotton. Some minerals are found, notably nickel in New Caledonia.¹ The natives belong to

¹ Chisholm

¹ The two chief sources of the world's nickel are Ontario in Canada, supplying about $\frac{3}{4}$ of the total, and New Caledonia which supplies the bulk of the remainder.

the Papuan stock and are said to practise cannibalism and head-hunting; but the fact seems to be that they are primarily an agricultural folk who occasionally resort to food-gathering and hunting in order to supplement their meagre rations. Even these remote islands, on the other hands, now bear ample witness to the greater 'cannibalism' of Europe. The Bismarck Archipelago was formerly in German hands; now it is under British 'protection'. New Caledonia is French. Solomon Islands were, before the last War, partly German and partly British; now they are wholly in British hands. The New Hebrides are under the 'joint protection' of France and Britain. Melanesia comprises various other groups of islands, too numerous to mention; of these the Loyalty Islands belong to France; the Admiralty Islands, together with the islands of New Britain and New Ireland, actually form parts of what was formerly known as the Bismarck Archipelago; the islands of the Solomon group, which were formerly under Germany, are now administered by the Australian Commonwealth, while the original British possessions in that group are administered by Great Britain. Noumea, in New Caledonia, is a port of call on the route to Australia.

POLYNESIA, meaning 'many islands', is the general name given to the innumerable islands of the Pacific not grouped under the term, Melanesia. These are either of volcanic origin or of coral formation. Nearly all of them are located within the tropics and have abundant rainfall. They are—most of them—covered with dense tropical vegetation, and their chief agricultural products are yams, cocoanuts and breadfruit. The principal export is copra. Some minerals are found, notably phosphates. The natives belong to the so-called Polynesian race (or races?), of which there are two main stocks; the one stock, akin to 'the more European-looking Maori', is tall and slender and charac-

terized by long head, open eyes, light skin, thin lips and narrow but high nose; the other stock is shorter, darker, relatively coarse-featured and slightly brachycephalic or mesaticephalic. Most of these islands, especially the larger Crown Colony of Great Britain. The total area of the group is over 7,000 sq. miles, and the total population of nearly 200,000 consists, besides the natives, of a few thousand Europeans, Indians and, of course, half-breeds. The chief products are cocoanuts, sugar, bananas, rice, pineapple and cotton. A brisk trade has grown up. Suva, in the island of Viti Levu, is the capital and chief port with a fine harbour protected by coral reefs. Levuka, in another island, is also a considerable port with a fine natural harbour. The island of Nauru was formerly German; it is now administered jointly by Great Britain, Australia and New Zealand according to the League mandate. The Tonga or Friendly Islands are a British protectorate. The Society Islands, of which the island of Tahiti is the most important, the Low Islands and the Marquesas group are under French protection. The Marshall, Caroline, Pelew, Marianne or Ladrone Islands were formerly ruled by Japan according to the League mandate.¹ The Ocean island and the Gilbert and the Ellice groups are ruled by Great Britain as and the Ellice groups are ruled by Great Britain as protectorates. The Cook or Hervey Islands now form a part of the Dominion of New Zealand. The Fanning and Christmas Islands as well as the Penrhyn Island (formerly German) are also British. The Samoan or Navigator Islands and the Hawaiian or Sandwich Islands are owned by the U. S. A. The total area of the Hawaiian Islands is 6,500 sq. miles; the population of nearly

¹ The island of Guam belonging to the Mariane group, however, belongs to the U. S. A.

385,000 consists of various peoples—Japanese, Chinese, Portuguese, Filipinos, Americans and the natives. Of these various peoples the Japanese alone constitute nearly 40 per cent, while the natives and half-breeds constitute only 6 and 9 per cent respectively.² The whole group is very mountainous; but the climate is pleasant. The principal agricultural products are similar to those of the Fiji Islands. Sugar and pineapples are the chief items of export. The bulk of the trade is naturally with the U S A, of which the Hawaiian Islands are now regarded as a territory, and thus share the former's customs tariff. The chief imports, almost wholly from the U. S. A., are wheat, flour and pork. The imports are free of duty.

STUDIES AND QUESTIONS

1. Describe carefully, with the aid of sketch maps, the distribution of sheep in (North America), Australia, and New Zealand. Under what conditions does this animal thrive best? (C U, B Com '29)
2. Describe the principal industries of Australia, including agriculture. (C U., Inter. '40).
3. Give an explanatory account of the distribution of population in Australia. (C U, Inter. '29).
4. Why does not Australia, which is a large producer of wool, develop extensive woollen manufactures? (C. U. '35)
5. Discuss the development of east and west coasts of Australia and show how far the influence of climate is responsible for such development (C U, Inter. '28, '41).
6. What are the principal exports from Australia and New Zealand? Discuss the possibilities of increased exchange between these countries and India (C U., B Com '36)
7. Compare New Zealand with Great Britain in respect of (a) Geographical situation (b) Superficial configuration (c) climate (d) products and (e) density of population (C U Inter. '29, '43)
8. "Isolation and a small population have been potent forces in retarding the development of Australia".—Discuss (I I. B '42).

² Chisholm's *Handbook*, p 830.

CHAPTER II

THE AMERICAS.

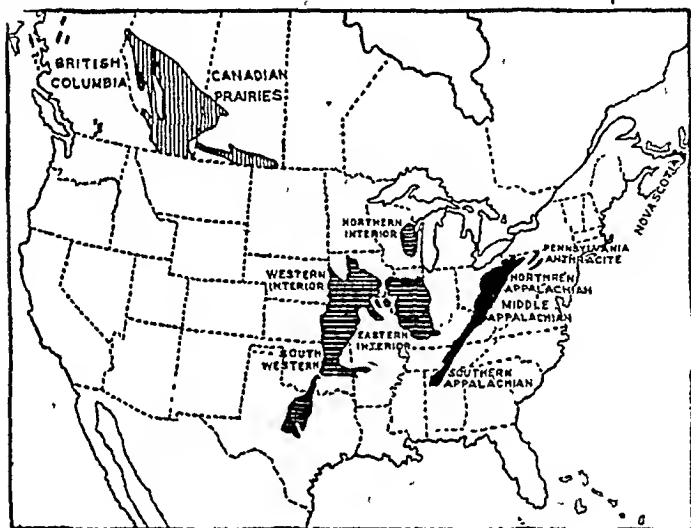
THE NEW WORLD

North America

Position and Size.—North America has an area of about 8 million sq. miles. Its position is best defined by Area. three lines of latitude and longitude: the Arctic Circle runs through the north of the continent across Alaska and Greenland; the Tropic of Cancer cuts through the southern tip of California and the middle of Mexico; and the longitude of 100°W. , passes through the heart of the continent from north to south. The coastline is longer relatively to area than that of either Africa or Asia. Position.

Physical Features.—North America falls into three broad physical divisions: (a) *The Rocky Mountain System* of the west is constituted by a series of Alpine fold mountains and intervening plateaus. In the north there is the *Coast Range* bordering the narrow and broken coastal plains; then there is the *Selkirk Range*, and in between the two are a number of small plateaus. Further east is the *Rocky Mountains*. Between the *Coast Range* and the *Rocky* is the *Plateau of Yukon*. In the middle region of the *System* is the *Coast Range* bordering the Pacific Ocean; then there is the *Cascade Range* and the *Sierra Nevada*; and farther east is the main mountain chain of the *Rocky*. The *Plateau of Columbia* and the *Colorado Plateau* lie in the intervening space. Farther south lies the *Plateau of Mexico*. (b) *The Central Plains* Rocky Mountain System.
Central Plains.

of North America are constituted by the lowlands round the Hudson Bay in the north, the lowlands round the Gulf of Mexico in the south, and in the west by the gradually rising plains adjoining the Rockies. (c) *The Eastern Highland*



THE COALFIELDS OF NORTH AMERICA

are constituted by the Appalachian System of Mountains and the Plateau of Greenland and the Laurentian Plateau (or Plateau of Labrador).

Geology and Minerals.—The Rocky Mountain System is formed by Alpine fold ranges and plateaus of ancient rock formation. Naturally therefore it is associated in places with various minerals such as gold in the Yukon, silver in Mexico, and a variety of minerals in the United States. Oilfields also occur on the flanks of the mountain chains. The great 'Canadian Shield' is a mass of ancient crystalline rocks, in many places highly mineralised; and

so a large number of minerals such as iron, copper, silver, gold, cobalt, and nickel are found in that region also. The Appalachian Mountains are also formed of ancient rocks, and on the western side of them lie the richest known coalfields in the world. Important oilfields also occur on the flanks of the Appalachians.

Climate.—The warm North Pacific Drift flows along the west coast of North America, keeping it warm. The west coast is also under the influence of the warm, moist Westerly Winds (S. W. Anti-Trades); but the Rockies act as an effective barrier and prevent them blowing inland. The heart of the continent is, however, open to Arctic influences in winter. The climate of the interior is continental. The south-eastern parts of the continent are under the influence of the N. E. Trade Winds. Rainfall is rather heavy on the northern part of the west coast and the Pacific slopes of the Rockies, since the region lies in the Westerly Wind Belt, and therefore has rain all the year round. So also does the eastern sea-board, which is under the influence of the N. E. Trades. But in the interior precipitation occurs mainly in summer; while the eastern half of this region has a fair share of rain, the western half is exceedingly arid. A small part of the west coast, however, has winter rain.

THE STATES OF N. AMERICA

CANADA

Canada is a British Dominion. It is over $3\frac{3}{4}$ million sq. miles in area and has a population of about 10,400,000. It stretches from the Arctic Ocean on the north to the boundary of the U. S. A., on the south, and from the Pacific shores on the west to the Atlantic shores on the east. Thus

the whole territory is entirely outside the tropics; and in this Canada offers a sharp contrast to Australia, another British Dominion. It readily falls into the three broad physical divisions enumerated above: there is the *Rocky Mountain System* in the west; farther inland is the great *Central Plains*; and in the east are the *Eastern Highlands*.

(a) The *Rocky Mountain System* roughly coincides with the province of British Columbia. The whole region is mountainous; the coastal areas are often deeply fiorded and separated by narrow straits. Of the numerous islands that lie in this region Vancouver is the largest. It is a region of the S. W. Anti-Trades, and thus receives abundant rainfall; but the distribution of rainfall is governed by topography with the result that while the exposed mountains receive an abundant supply of moisture, the sheltered plateaus and valleys lie in their rain-shadow. The warm North Pacific drift flows by the coast keeping it warm. The mountains are often covered with coniferous forests yielding good quality *pine*, *fir* and *cedar*. Lumbering is, therefore, an important industry in this region.

(b) The *Central Plains* roughly coincide with the three *Prairie* Provinces of Alberta, Manitoba and Saskatchewan. In the north only there is an area of lowland round Hudson Bay. The *Central Plains* are for the most part, neither flat nor low-lying. But the surface is smooth and the land rises very gently and gradually towards the west. The height is nowhere less than 500 ft. and in most places over 1,000 ft.

(c) The *Eastern Highlands* are much lower than the western mountains. They fall into two parts, the *Canadian shield* and the Northern Appalachians of the Maritime Provinces, separated by the estuary and the lowlands of the St. Lawrence.

The Canadian shield, with an area of nearly 2 million sq. miles, occupies more than half the total area of Canada. The greater part of the shield is composed of ancient crystalline rocks. The greatest height is found in N. W. Labrador, where it rises to over 6,000 ft. The surface of the shield is very rugged. The St. Lawrence Valley which separates the Canadian shield from the Maritime provinces is a long, flat-floored, narrow depression. The Appalachian mountains of the Maritime provinces consist of a series of parallel ranges separated by wide valleys.

Climate.—The climate of Canada is controlled by its latitude, its size and its relief. The whole of the country falls within the cool temperate belt. In the north it has sub-Arctic and Arctic conditions. Except the Western coastal areas, the winter over the whole of Canada is both long and severe and the seasonal range of temperature is very great. The west coast has a cool temperate western marginal type of climate, with rainfall at all seasons and moderate temperatures. The rain is caused by the westerly winds. Although the rainfall on the Coastal Ranges is over 80 inches a year, the average annual rainfall is 60 inches. The warm North Pacific Drift, keeps the climate equable. East of the Rockies the climate becomes markedly continental in character. While the Rockies effectively shut off the moderating influence of the sea, there are no mountain ranges on the north to obstruct the chilly Arctic winds from entering the land. The winters in central Canada are very cold while summers are warm. The heat of summer is greater in the South. In winter the temperature for the coldest month falls upto 0°F. and the ground remains frozen for at least one month each year. Rainfall in Central Canada is very light decreasing from about 25 inches a year, in the east to about 12 inches a year in the south-west of

Temperature
and rainfall

Alberta. Most of it comes in the summer and the winter is dry. The climate in eastern Canada is less extreme than that of Central Canada. But the St. Lawrence remains frozen for at least six months in one year. This is due mainly to the fact that winds blow off-shore during winter from the frozen interior of the country. Moreover, the cold Labrador Current flows southwards past the St. Lawrence from Davis Strait. The eastern and southern coasts of Nova Scotia and New Brunswick remain ice-free even during the coldest months. The rainfall is uniform and moderate at all seasons (average 50 inches a year).

Agriculture.—It is easily the most important industry of Canada. Agricultural products form almost 40 per cent of the total exports. The vast stretches of fertile soil in the prairie lands and the climatic conditions are highly suitable to the growth of cereals (edible grain).

Wheat is the most important crop of Canada. Though occupying the sixth place in the production of wheat, Canada is now definitely the largest exporter of the commodity of the world. Wheat is grown here in two varieties—"Winter Wheat" and "Spring Wheat". Winter wheat is sown in autumn and reaped the following summer. It has larger yield per acre than the other variety, which is sown in the spring and harvested in autumn. Spring wheat is grown mainly in the Prairie Provinces of Manitoba, Saskatchewan and Alberta. Ontario, British Columbia and parts of Alberta grows winter wheat. The one great defect in the areas of wheat production in Canada is the occurrence of droughts from time to time.

The second most important crop of Canada—Oats are grown in Saskatchewan, Ontario, Alberta, Quebec and Manitoba. They occupy half the acreage under wheat and are grown mainly as cattle fodder but are used also for breakfast foods.

Barley is grown mainly in the wheat-growing provinces and maize is almost solely confined to Southern Ontario.

Other minor crops are flax grown in Saskatchewan mainly for its seed, sugar-beet in Alberta and Ontario and tobacco in the Lake Peninsula



AGRICULTURE OF CANADA.

Fruit growing is also an important industry in Canada where the Lake Peninsula of Ontario (lying in the same latitude of Northern Spain and Italy) grow apples, pears, plums, peaches, apricots, grapes and many small fruits. British Columbia has many sheltered valleys, and fruit-farming is becoming increasingly important.

Fishing is one of the leading commercial industries of Canada. Canada's fisheries which are regarded as the third most important in the world, fall into three divisions (1) The Atlantic fisheries. (2) The Pacific fisheries. (3) The Lake fisheries

Cod is the most important fish of the Atlantic but haddock, herring, mackarel, salmon and other fishes are also abundant. The shores of the Atlantic are the most extensive lobster fishing grounds of the world. Whale and Seal are found off the coast of Labrador.

The Pacific fisheries contribute 40 per cent., of the total yield of the Canadian fisheries. Salmon is by far the most important fish found there. Halibut and Herrings are also caught.

The rivers and lakes of Canada abound in trout and other fish. The great lakes contain trout, salmon, herring etc. and are prolific in their yield. Fish-canning is an important industry in Canada.

Lumbering.—The great forests of Canada produce excellent timber in large quantities. The most important lumbering provinces are British Columbia, Ontario, Quebec, and New Brunswick. Lumbering is generally carried on in winter. The timber is drawn over the hard frozen marshes in winter and floated down the rivers to the saw-mills in Spring. Ottawa (Ontario) and St. John (New Brunswick) are the leading centres for saw-mills and the rivers of the same name are the busiest timber rivers in Canada. The soft wood conifers yield fine wood-pulp for the manufacture of paper, and Canada is the largest exporter of this commodity now. Furs also constitute an important forest product. The forests in the North are the home of many animals whose thick furry coats protect them from the severe winter cold. The fur traders penetrate into these regions and trap the animals or buy the skins from the natives. Through these fur traders much of the interior of Canada has come to be known.

Stock raising is also very important in Canada. Beef cattle are reared in large number in Alberta and Saskat-

chewan. There is an abundant supply of fine grass which provides food for the cattle all the year round.

In the Eastern provinces of Ontario and Quebec, cattle are reared in large number for the dairy produce, especially cheese and butter, which are important exports. Here the pastures are richer than the Prairies; but there is one difficulty, that is the winter being cold the cattle is to be housed. Dairy Cattle.

Ontario and Quebec rear about 60 per cent., of Canada's sheep, though sheep rearing is not a large-scale industry in the country owing to the severity of cold in winter. Sheep.

Mining.—Canada is rich in minerals, both useful and precious. But the development of these resources is not yet satisfactory. The development of these resources is chiefly dependent on transportation facilities, but is also influenced by economic considerations. For example, it is cheaper for Ontario and Quebec to import coal *via* the great lakes from the U. S. A., than to obtain it from the mines of the country. Canada ranks second in the production of gold, among the countries of the world. It is one of the few countries in the world where the output of gold is increasing. The chief gold-producing areas are Ontario, British Columbia, Quebec and the Yukon. Nova Scotia has some gold but it is not very important. Copper is mainly obtained from British Columbia, producing more than 50 per cent., of the total Canadian output. There are also large deposits in Ontario and western Quebec. It is often found associated with gold. Silver is found in British Columbia and Ontario. The Dominion stands first in the world as a producer of asbestos and nickel. Nickel output is obtained almost entirely from the Sudbury District of Ontario. 90 per cent., of the total world supply of the mineral is from Canada, and it also contributes 95 per cent., Minerals.

to the world supply of asbestos, which is entirely mined in S. W. Quebec. Lead and Zinc are obtained chiefly from British Columbia and deposits also exist in Manitoba and Ontario.

Canada is well provided with useful minerals of which Coal is the most important. It is chiefly found in (1) Nova Scotia and New Brunswick, (2) Alberta, (3) British Columbia, (4) Vancouver Island. Potential fields also exist in Saskatchewan, the Yukon and New Brunswick. The Coal fields of Nova Scotia, which furnish about 40 per cent. of the Canadian output, are associated with valuable deposits of Iron. The coal of this place is of excellent quality and much of it is exported to U. S. A., and Newfoundland. Iron ore is obtained from Texada Island, Ontario, Alberta and Saskatchewan besides Nova Scotia.

Petroleum is found in small quantities in Alberta, Ontario and New Brunswick. The output is increasing in Alberta and Petroleum is also being exploited in the low Mackenzie valley of the far North.

The other minerals of minor importance in Canada are Platinum and Radium.

Industries.—Want of capital and smallness of markets due to sparsity of population, and the great attraction of the food producing industries retarded the growth of manufacture in Canada in the pre-war days. In more recent years, however, the dominion has made rapid progress in the development of manufacturing industries on a large-scale, assisted by her abundant power supply in the form of coal and water-power and the expansion of her extensive railway system. To-day Canada is the leading manufacturing country of the British Empire over-seas although still her chief industries are flour-milling, meat-packing, dairying, fruit-preserving, fish-canning, sugar-

refining etc., which are nothing but elaboration of food products. Winnipeg is the flour-milling centre. Toronto, on Lake Ontario is also a great centre.

Next to the food-producing industries come those industries which utilise wood and wood products. Canada is now the greatest manufacturer of newsprint in the world. The abundance of timber has given rise to the industry of saw-milling at numerous waterfalls. Ottawa and Hull are the important paper-making and saw-milling centres.

Manufacture of leather, cotton and woollen goods and construction of Iron and Steel goods are now growing in importance. Quebec and Montreal in Quebec are the most important industrial centres. Large Iron Works have been established at Sydney in Cape Breton Island, Pictou at Nova Scotia and New Glasgow where local iron is smelted with local coal. Steel as well as Iron is now manufactured at the Sault Sainte Marie falls in Ontario, and at Hamilton and Midland. The manufacture of Motor cars and parts, Railway plants and agricultural machinery are also becoming very important. Canada is also fast developing its Ship-building and Aviation industries

Communication System.—Of the waterways of Canada, the most important is that afforded by the St. Lawrence and the Great Lakes. The St. Lawrence has been dredged until it now has a minimum depth of 30 ft. With the help of several canals, of which the most important are the New Wellard Canal, between Lakes Ontario and Erie, and the Sault Sainte Marie—commonly known as the Soo Canal, between lakes Haron and Superior, navigation is possible upto Port Arthur. Between Montreal and Lake Ontario, navigation is restricted to boats only, the

depth being near about 14 ft. only. There is a project under consideration for opening a deep sea waterway from Montreal to the Great Lakes. The St. Lawrence system provides more than 2000 miles of waterways to Canada. This river, despite its importance, has several drawbacks, such as the freezing of the estuary in winter months, the great force of the current, presence of rapids and the frequency of fog, etc. The other rivers, namely the Mackenzie, the Nelson—Saskatchewan, the Red river of the North etc., are navigable but as most of them freeze in winter and the depth not being very great, they are of local importance only. The other lakes of Canada namely Winnipeg, Athabaska, Great Slave and Great Bear may increase in importance with the opening up of the Northern Land.

The economic growth of Canada is to a great extent the result of the development of the railway system. The railways of Canada with the exception of the *Canadian Pacific* are owned by the Government. This railway is the longest in Canada (3500 miles) and joins the Atlantic Coasts of Canada with its Pacific Coast. The line runs from Halifax and St. John to Montreal. From Montreal it goes to Winnipeg, the great wheat centre of Canada. From Winnipeg, it reaches Medicine Hat in the rockies. Leaving Medicine Hat, the line goes through Kicking Horse Pass and ends in Vancouver. The *Canadian National Railway* forms a trans-continental route from Halifax to Prince Rupert, entirely within the Canadian territory. From Halifax it goes to Winnipeg via Quebec and thence to Edmonton which is rapidly becoming a railway centre. From Edmonton the line crosses the rockies by the Yellowhead pass and runs down the Skeena valley to Prince Rupert, where a large port has been established on one of the best natural harbours of the Pacific Coast.

The main line of the *Canadian Northern Railway* starts from Montreal and goes by way of Ottawa to Port Arthur. From there it runs to Winnipeg, entering the U. S. A., for a short distance and from Winnipeg to Edmonton. It then strikes across the Yellowhead Pass and turns South and goes to Vancouver via Thompson and Fraser valleys. This line carries the grain traffic of Canada.

The innumerable branch lines have played a large part in opening up the agricultural areas of the West. Railways also cross the artificial frontier between Canada and the U. S. A., and thus link up the two systems. The project of joining Prince Albert and Port Churchill, Hudson Bay, will also be helpful to Canada's agriculture.

Trade and Commerce.—The principal exports of Canada are wheat, woodpulp and paper, timber, nickel, motor cars, cooper, fish, fruits, etc. The U. S. A., and the United Kingdom take between them over 75 per cent., of Canadian exports. The imports are more diverse than exports. The chief commodities imported are petroleum, coal, iron and steel, sugar, electrical apparatus, cotton and woollen goods, automobile parts, machinery, etc. Over four-fifths of the imports are from the United States and the United Kingdom. The U. S. A., supplies alone 67 per cent., of the imports.

THE UNITED STATES OF AMERICA

The United States of America extends from the Canadian borders on the north to the Mexican borders on the south, and from the Pacific coast on the west to the Atlantic coast on the east. It includes 48 states, and holds sway over Alaska, the Philippine Islands and the Hawaiian Islands. The whole territory of the union has

Position
and
Extent.

cover about 14 per cent. of the entire land surface, and a little over 5 per cent is classed as scrubland. But strangely enough the United States is now largely dependent on foreign supplies of wood-pulp and paper. These are obtained mainly from Canada.

Geology and Minerals.—The Rocky Mountain System is composed of folded rocks of all ages. The Appalachian mountains are formed of ancient rocks. A part of the Laurentian shield is found in the north near the Canadian border. With the exception of the above portion, the whole of the Central Plains consists of sedimentary rocks but slightly folded. The Western Mountain System consists of a highly folded complex rocks of varying ages.

Minerals of various kinds, especially those of industrial importance, are found in abundance. The U. S. A., is more than self-sufficient in coal, iron and petroleum. It leads the world in the production of copper, lead and zinc. Valuable metals like gold and silver are found in large quantity. In 1929 the total value of minerals raised was estimated at 5,878,000,000 Dollars¹

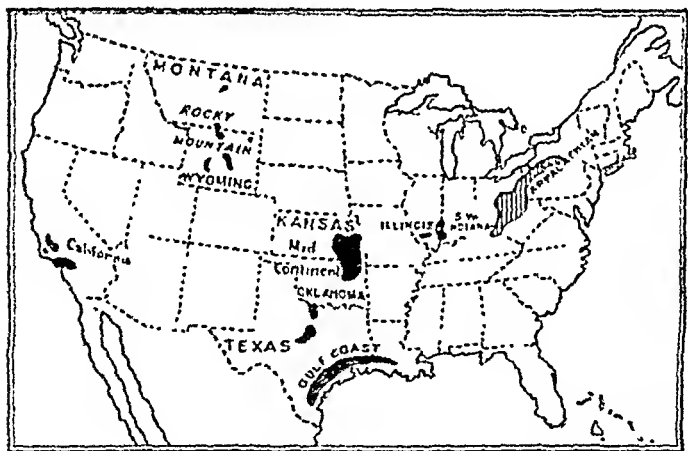
Coal—About one-third of the total annual coal production of the world is raised from the U. S. A. More than half her coal is obtained from the Appalachian coal-field, which lies in the eastern part of the country. It extends from Pennsylvania, through western Virginia, Kentucky, Tennessee into Alabama. The coal is easily worked. Good quality anthracite is found in E. Pennsylvania. The remainder of the Appalachian coal is bituminous. In the middle-west there are two fields, one in Illinois, Indiana and west Kentucky and the other stretching from Iowa to Arkansas. There are also small fields in

¹ Stamp—*North America*.

Michigan, Colorado, Wyoming, California and in the western part of the Gulf region in the south-east. About 95 per cent of the coal raised is consumed within the country.

Iron is most abundant in the states of Michigan, Minnesota and Alabama. The total output of iron-ore from the U. S. A is now about a third of that of the whole world. The ore from the Lake region is shipped via the Great Lakes, to the heavy industrial area within the Chicago-Buffalo-Pittsburgh triangle. The presence of iron and coal *Iron ore.* in close proximity in Alabama, has led to the development of an important iron and steel industry around and near Birmingham.

Oil—The U. S. A is by far the most important producer of mineral oil with a steady output of nearly two-thirds of Mineral oil of the world's total. Of the huge output about 70 per cent



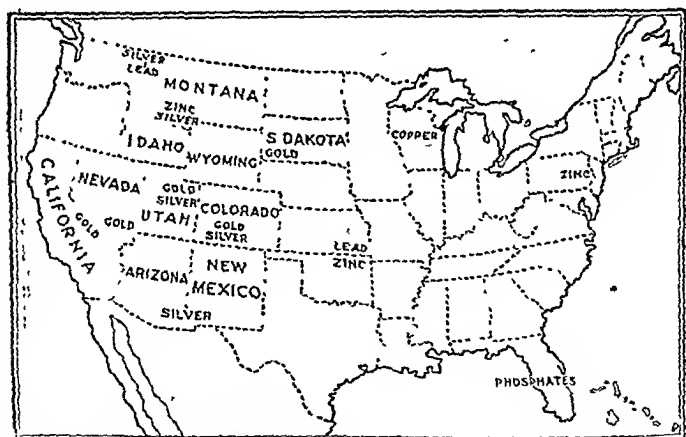
THE OILFIELDS OF THE UNITED STATES

comes from the three states of Oklahoma (25 per cent), California (24 per cent) and Texas (21 per cent). Other,

important centres in order of production are Kansas, Louisiana, Wyoming, Illinois, and Kentucky. At one time the Appalachian fields supplied a huge quantity of oil but the production at present is insignificant. Despite huge home consumption, the U. S. A., exports large quantities of petroleum and petroleum products.

Copper—The United States is the leading producer of copper with about 60 per cent of the world's output per annum to its credit. It is found mainly in the Laurentian rocks of Michigan and in Arizona, Montana, Utah, Nevada and California.

Gold—It is found mainly in Alaska, California, South Dakota, Colorado, Utah, Arizona and Nevada. The U. S. A., is one of the leading gold-producing countries of the world and the production has increased recently after a decline.



THE METALLIFEROUS MINERALS OF THE UNITED STATES

Silver—The U. S. A., ranks second among the silver-producing countries of the world. The chief centres are

Utah, Idaho, Montana, New Mexico, Arizona, Colorado and Nevada.

Lead—The U. S. A., ranks first among the lead-producing countries of the world. The normal annual production is one-third of the world's total output. The principal areas of production are the Joplin district of Missouri, Idaho and Kansas, whilst large quantities are produced alongside silver in Utah.

Zinc—The U. S. A., produces over 40 per cent of the world's supply of zinc, the principal areas of production being the Joplin district in Missouri, Franklin Furnace (New Jersey) and Montana.

Other Metals include Aluminium (mined in Arkansas), Platinum, Antimony and Mercury. A variety of precious stones is also found. Other metals and non-metals.

Among the non-metallic minerals salt (Michigan, New York, Ohio, California and Utah), sulphur (Louisiana and Texas), phosphates (Florida) etc., rank high in importance.

Among the minerals of industrial importance the U. S. A., is devoid of Tin, Manganese, Nickel and Chromium.

Agriculture.—The United States is the leading agricultural producer in the world and its output of grain, cotton and tobacco etc., exceeds that of any other country. Although the relative importance of agriculture has declined, it will be erroneous to call the U. S. A., a pre-eminently industrial country. Twenty-one per cent. of the people gainfully employed are engaged in agriculture and receive about 18 per cent. of the national income.

The main agricultural regions lie in the eastern half of the country, where the rainfall is fairly abundant. The western half is too dry for crops and so are devoted to sheep-

rearing and stock-farming. In the Pacific coastal areas fruits and grains grow.

Wheat is the most important crop. There are two markedly distinct belts. The "spring wheat" belt lies to the north-west and is a continuation of the Canadian prairie wheat region. The "winter wheat" belt lies south of the corn belt and north of the cotton belt. Most of the wheat in U. S. A., is winter wheat. This crop is also grown in the N. W. states of Washington and in the Californian valley. The most important wheat-producing states are North Dakota, Kansas, Washington, Montana, Oklahoma, Nebraska, Ohio and Illinois.

Maize or Indian corn occupies the largest acreage under crops in the U. S. A. It grows mainly in the Central states. Iowa, Nebraska, Illinois, Minnesota, Missouri, Indiana, Ohio and E. Kansas are the leading producers. The greater part of the total output is used as food for cattle, pigs and sheep. The maize belt is the chief cattle and pig-rearing region of the country. The U. S. A., is the world's largest producer of maize.

Cotton.—The U. S. A. produces over 50 per cent of the total world crop. It is grown mainly in the south-east where the "Gulf" type of climate prevails. The state of Texas is now the largest producer. Other important cotton-producing states are Georgia, Louisiana, and Carolina. California and Arizona in western U. S. A., grow cotton under irrigation. The average yield per acre is 160 to 170 lbs. Cotton is the most important "cash crop" of the U. S. A. Nearly 50 per cent of the total output is exported.

Tobacco is another important crop of the U. S. A. The important producing states are Kentucky, Tennessee,

North and South Carolinas and Virginia. The U. S. A. produces about one-third of the world's total annual output. There is a large export trade.

The minor crops are Oats (cool, moist northern states), Minor Rye (Lake states), Barley (associated with spring wheat), crops. Rice (under irrigation in Texas, Louisiana and California), Sugarcane (Louisiana and Texas), Sugar beet (New York, Utah, Michigan, Ohio and California) and Fruits (California and Florida).

Manufacturing Industries.—The United States is now the most important manufacturing country of the world. This premier position has been attained mainly due to the abundant supplies of coal, iron and other metals and of raw materials in general. The manufacturing districts lie mostly in the East. The North-East including New England and the states of New York, New Jersey, Pennsylvania with the adjacent parts of Ohio, is the most densely populated region in the U. S. A. This dense population provides both abundant labour and an adequate home market. Here the majority of people are engaged in industry and the average income is relatively high. The New England States were the early seat of many manufactures. But there has been a spread of manufactures towards West and now the Industrial belt of the U. S. A., extends from the New England States, New York, Philadelphia, Baltimore on the East to Chicago, Milwaukee and St. Louis on the West. The manufactures of the U. S. A. may be broadly classified under four heads—(1) those concerned with the elaboration of food products. (2) The manufacture of textiles and articles of clothing. (3) The metallurgical industries including transport materials. (4) Miscellaneous Industries.

Food Industries include slaughtering and packing of meat, fruit-preserving, fish-canning, confectionery, dairying and flour-milling. The ranching area in the west and the maize belt has given rise to an enormous trade in preserved meat. The use of cold storage and refrigerator cars has led to the concentration of the meat-packing industry in a small number of cities. Chicago, Kansas city, Omaha, St Paul, St. Louis and Indianapolis are the important centres¹. Fruit preserving is important in California. Dairy farming is concentrated along the northern edge of the corn belt. Wisconsin, Minnesota, Iowa, Pennsylvania and New York are the leading butter and cheese manufacturing states. The chief flour-milling centre is Minneapolis; other centres are New York, Buffalo, Milwaukee, and Kansas city. Manufacture of cocoa, chocolates and confectionery is carried on in the States of New York, Massachusetts, Illinois and Pennsylvania.

The Cotton Industry is the most important of the Textile industries of the U S A. This industry was originally established in the New England States, but now they are second in importance to the centres in and around the raw cotton producing belt of the South. The localisation of the cotton industry in the New England States was due to the moist climate, water power and easy access to the cotton plantations of the South and to a large market. But the water power is insufficient for present day needs and New England cotton industry now depends on coal from Novascotia and Appalachian fields. Manchester (New Hampshire), Fall River, and Lowell and New Bedford (Massachusetts) and Providence (Rhode Island) are the leading centres of cotton industry. The abundance of cheap

¹ Stamp—*The Americas*, pp 77.

labour and ample supplies of water power have been the chief factors in giving rise to the cotton industry in the Southern region. Coal and raw materials are available locally. The leading centres are Charlotte (N. Carolina), Columbia and Greenville (South Carolina) and Augusta and Atlanta (Georgia). The factories of S. E. States consume more raw cotton than those of New England States. The South exports much of its products which is coarse.

Woollen Goods are manufactured in almost every state in the U. S. A., but the New England States (produce over 60 per cent) and Massachusetts and Pennsylvania are the states mainly concerned, Philadelphia being the great woollen centre.

The principal centres of Silk manufacturing are in the states of New York, New Jersey and Pennsylvania. The raw material is imported mainly from China and Japan.

The U. S. A. is the greatest of all **Iron and Steel** manufacturing countries of the World. Pittsburgh, in Eastern Pennsylvania, is the leading centre of American iron and steel industry. Best coking coal is found at hand and originally iron-ore also existed here. At present local supply of iron-ore is insufficient and most of the ore is received from the Lake Superior regions via the Great Lakes. Other centres are Youngstown, Cleveland, Buffalo and Birmingham in Alabama where the presence of iron, coal and limestone in close proximity has given rise to a successful iron and steel industry. The manufacture of machinery is carried on in all the great cities especially in Philadelphia, Chicago, New York, Pittsburgh, and Gary. Chicago, Buffalo, Detroit and Worcester and Philadelphia make Railway plant. Detroit is the largest centre of the automobile industry. Philadelphia, Wellington, Seattle and San Francisco are the leading ship-building centres.

Among the miscellaneous industries paper making and manufacture of chemicals and drugs are noteworthy. Philadelphia and Holyoke are the centres of paper making. New York, Philadelphia, Baltimore, Atlanta, Indianapolis and St. Louis are the important chemical manufacturing centres. Philadelphia has the largest leather industry in the world. Richmond (Virginia), Tampa (Florida) and New York are the centres of cigarette manufacturing. New Jersey has pottery works in Trenton. The motion-picture industry is localised in Los Angeles mainly due to the suitable climatic conditions of the Mediterranean region.

Communication System (a) Railways—Although the Road transportation system is highly developed in the U. S. A., and motor-buses and lorries compete with the railways for carrying goods and passengers for long distances, yet railways retain their importance as the premier means of communication. The Railways of the U. S. A. have a length of about 248,000 miles. The whole of the land is covered with a network of lines especially in the east. From the west of the Appalachians runs the true trans-continental lines of the country to the Pacific sea-board. Through means of communication between east and west is provided by numerous Trunk routes. The five main trans-continental lines are:—

(i) The Great Northern—This line runs from Duluth on the west of Lake Superior to Seattle on the Pacific Sea board.

(ii) The Northern Pacific runs from St. Paul to Seattle. These two routes run to the East coast *via* the Hudson-Mohawk valley.

(iii) The Union Pacific Line runs from Omaha to Cheyenne, crosses the Evans pass and thence goes to San Francisco *via* the Sacramento Valley. Branch lines run to

Portland on the north and Los Angeles on the south. Connection with the east is made from Omaha *via* Chicago and Pittsburg to New York.

(iv) The Southern Pacific connects New Orleans with San Francisco keeping close to the Mexican border.

(v) The Atchison Topeka and Santa Fe line runs from Kansas City to Santa Fe and thence to San Francisco *via* the lower Californian Valley.

(b) Waterways—Of the waterways the Panama Canal although it does not lie within the borders of the country, is of vital importance to the U. S. A. It brings the two coasts of the country nearer together by sea. Thus the importance of the trans-continental lines are much reduced, as railway transportation is much more expensive. It also enormously reduces the distance between the eastern ports of America and the ports of Asia. As a short cut between the two great oceans it has doubled up the country's naval power in each.

Within the country itself the St. Lawrence and the Great Lakes (Superior, Huron, Michigan, Erie and Ontario) form an admirable waterway. Besides there are many great rivers which are navigable upto considerable distances. Of these the Mississippi and the Missouri are the most important. The Missouri which joins the Mississippi at St. Paul, is navigable upto the foot of the Rockies. This system provides an important means of communication for central U. S. A. The Ohio, a tributary of the Mississippi, is navigable upto Pittsburg. The great defect of this waterway is that it is subject to seasonal floods. The waterways of the U. S. A. cover nearly 20,000 miles.

Trade and Commerce.—The U. S. A., has a large volume of foreign trade. Although raw materials and food-stuffs form the bulk of her exports even now, they no longer

are the sole exports. Raw cotton ranks first in value among the commodities exported. Tinned meat, cheese, leather, hides, timber, tobacco, minerals and mineral oil are the other important exports. From the end of the 19th century a remarkable development of the export trade in manufactured articles took place. The principal manufactured goods exported are iron and steel, machinery, motorcars, trucks and spare parts, aircrafts and textiles. Iron and steel goods now rank third in value on the list of exports. Among the imports wood-pulp and paper rank first. They have to be imported from Canada in spite of large home production, because of huge home demand. Other imports are products of tropical and equatorial regions which do not grow in the country. Such imports are rubber, sugar, coffee, tea, silk, tropical fruits, jute, spices etc. etc. The minerals imported include tin and diamonds. Manufactured goods of superior quality and luxury goods are imported from Europe.

The United Kingdom is the best customer of the U. S. A., taking 17 per cent of her exports and supplying 10 per cent of the imports in 1939. Within recent years there has been a remarkable development in the trade with Canada and the South American States. The Foreign trade of the U. S. A., is widely distributed and almost all the civilised countries of the world have trade relations with the states.

MEXICO

Mexico lies to the south of the U. S. A., and to the north of Central America with the Pacific to the west and the Gulf of Mexico to the east. It is a fairly large country having an area of 767,000 sq. miles. The population is estimated to be nearly 17 millions.

It is a high plateau (4000 to 8000 ft. high) bordered by the eastern Sierra Madre on the east and the western Sierra Madre on the west, with a narrow coastal strip on either side. The natural regions are —(a) the western deserts including lower California, (b) the temperate hill slopes, (c) the Gulf coast, (d) the western plateau divided into hot zone, temperate zone and cold zone respectively.

Physical features.

Broadly speaking, the climate is tropical along the coast, temperate on the plateau and cold on the lofty mountains. The northern portion is semi-desert and even the north-eastern coastal strip is a dry scrubland. The S. E. coastal plain is hot but receives a heavy summer rainfall (30"—60"). Most of the rain falls on the outer slopes. There is a great range of temperature between summer and winter.

Climate

Agriculture.—The Gulf coastlands, as a result of the tropical climate, produce sugarcane, rubber, tobacco, cocoa, hemp, coconuts etc. In the temperate hill slopes cotton, wheat, maize and coffee are grown. Sheep and cattle are also reared. The high plateau (over 6000 ft.) is deficient in rainfall and the conditions are not favourable for cultivation. However cotton, wheat and maize are grown with the aid of irrigation. The west and north-west are economically unimportant as they are semi-deserts. Some sheep are reared here.

Agriculture

Minerals.—The country is rich in minerals, and more than 66 per cent. of all the exports are minerals. Mexico is the leading silver producing country in the world (nearly 40 per cent. of the world's total). The chief mining districts occur in the plateau region. The principal silver mines are in the states of Durango and Chihuahua in the north and of Hidalgo in the south. The position of Mexico as a producer of gold has improved in recent times. Copper is widely distributed. It occurs mainly in the states

Minerals

of Sonora and Coahuila. Iron is said to be very abundant in Mexico and it is mined in various places. The deposits of northern Coahuila and of the State of Durango are the most important. A few years ago, Mexico ranked next to the U. S. A., in the production of mineral oil, but in recent years the production has dropped considerably. The important producing regions are the state of Vera Cruz, west and south of Tampico and on the northern part of the isthmus of Tehuantepec. The coal production of Mexico is not even sufficient to meet the home demand. The other important mineral products are lead and zinc.

Manufacturing industries are not yet much developed. This backwardness is due to want of capital and skilled labour, undeveloped state of communication system and frequent political disturbances. Cotton industry is the most advanced at present. Iron foundries and steel works have been established at Monterey and Chihuahua. Woollen mills, sugar mills, potteries, tobacco factories also are in operation but usually on a small scale.

Trade, Routes and Towns.—The railway system of Mexico is developing rapidly with state aid. It has now over 18,000 miles of rail road. All the inland towns are connected by means of railways to the ports. The ports are also linked up with the U. S. A. railway system. The chief ports are Vera Cruz and Tampico on the Gulf of Mexico. The chief exports are minerals—*mineral oil, silver, lead, zinc, and copper*, to name only the principal ones. Other items of export consist chiefly of agricultural products such as *cotton and coffee* and some *bananas*. In return the country imports manufactured goods and food-stuffs. About 90 p.c. of the export trade is with the U. S. A. Mexico is the capital and principal city of the republic.

CENTRAL AMERICA

The Central American Republics include Guatemala, Honduras, San Salvador, Nicaragua, Costa Rica, and Panama. These are small states, economically of little importance, and largely undeveloped owing to frequent revolutions.

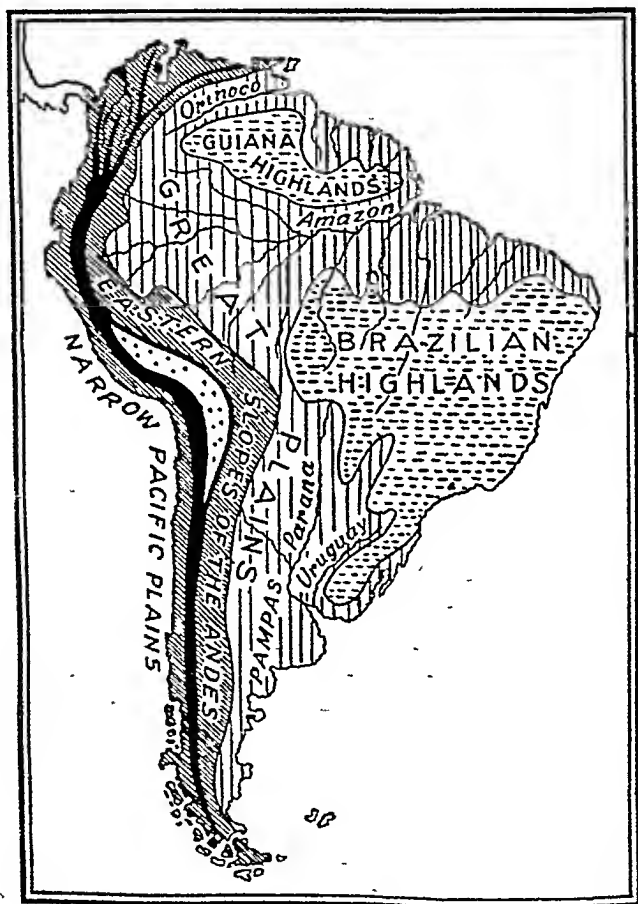
Of the numerous islands of the WEST INDIES only three are important—Cuba, Porto Rico, and Haiti. Cuba has a large output of *sugar* and *tobacco*, and being in alliance with the U. S. A., exports most of its products to that country.

STUDIES AND QUESTIONS

1. Examine and estimate the coal and petroleum resources of the U.S.A. (C.U., '32, '41, '45).
2. Examine the present position of the iron and steel industry of the U. S. A. (C. U. '36, U.P. '36).
3. "Though possessing practically all advantages for the development of industries, Canada is mainly an agricultural country." Why? (C. U. '37).
4. Locate the chief mineral and industrial regions of North America (C. U. '38, '39).
5. What are the chief agricultural products of the U.S.A., and where are they produced? (C.U., '38)
6. What are the chief mineral products of the U.S.A., and from where are they obtained? (C.U., '40).
7. Write a short essay on the situation of the chief coal-fields and the chief manufacturing areas of the U.S.A. (C.U. '42, '44)
8. To what natural conditions would you ascribe the export of tobacco from the U.S.A. (U.P., '37).
9. Describe the mineral resources of Mexico and discuss the chances of their full development. (C.U. B. Com., '28)
10. Discuss the position of Canada as (a) an agricultural country, (b) as a producer of minerals. "Canada is the making of railways"—Discuss. (C.U., B. Com., '30).

SOUTH AMERICA

Position and Size.—The continent of South America has an area of some 7 million sq. mles. Its position is best defined by three lines of latitude and one line of longitude:



THE PRINCIPAL PHYSICAL FEATURES OF SOUTH AMERICA

the Equator passes through the mouth of the great River Amazon; the Tropic of Capricorn cuts through the middle of the continent; the latitude of 50°S. passes a few degrees north of Cape Froward, the most southerly point of the mainland, the central meridian of the continent is formed by the longitude of 60°W. It is not always realized, however, that the South American continent does not lie exactly south of North America,—it is to the south-east of the latter. It is a wedge-shaped land mass, tapering towards the south. more than two-thirds of the continent therefore lies within the tropics. But for the narrow Isthmus of Panama, which connects it with the North American continent, South America would be the largest island in the world; the Isthmus has, however, been actually cut through by the Panama canal. Position

Physical Features and Geology.—The continent of South America falls into three broad physical units Andean System.
 (a) The Andean System of the west lies, like the Rocky Mountain System of North America, close to the Pacific coast. The Andes are a fold mountain system enclosing a number of plateaus in the middle, but narrowing into one main range in the south; in the north the main range is broader, and ultimately it branches out into at least four important subsidiary ranges and one lesser range passing into the Isthmus of Panama. An extremely narrow coastal plain flanks the Andean System on the west. Valuable deposits of silver, copper, tin and other metals occur, especially in the high plateau of Bolivia. There are important oilfields in Venezuela, Peru and Argentina. (b) The Central Plains lie immediately east of the eastern slopes of the Andes, and consist of at least four major divisions; in the north is the Basin of the Orinoco River; then there is the great Basin of the Amazon; farther south lies the Basin Central Plains

ducts as coffee; and it is sometimes possible to cultivate temperate crops on the mountain ridges. The Central Andes also lie in the Trade Winds Belt—partly in that of the N. E. Trades and partly in that of the S. E. Trades. The mountain chains have enclosed a plateau rich in certain minerals. There are poor pastures here, and the facilities for cultivation are limited. Southern Andes are essentially a divide between the east and west, beyond the S. E. Trade Winds Belt. The mountain chains, on the other hand, cut off the N. W. Anti-Trades from blowing east into Patagonia. The Central Plains fall into four climatic sub-divisions: in the north is the Orinoco Basin lying on the right flank of the N. E. Trades. It is a large grassy plain, often called the Llanos. It is rather an undeveloped region yet. Then there is the vast Amazon Basin, the largest region of equatorial forests or the *Selvas* in the world. The whole of it lies in the N. E. Trades Belt, and enjoys heavy showers all the year round. The Amazon Basin is the original home of the rubber tree. Enormous tracts of the Amazon Basin are liable to floods, and the region still lies the little developed (pp. 17—21). The Basin of the Parana-Paraguay lies partly in the belt of the S. E. Trades; it is, on the whole, a temperate region, covered in the north by warm temperate forests and in the south by grasslands or *Pampas*, as they are called. The grasses have now largely yielded place to crops, especially in the Argentine Republic. South of the *Pampas* lies the dry, cool, temperate Desert of Patagonia. It is in the rain-shadow of the Southern Andes, and very sparsely inhabited. A few sheep are, however, kept here by the local inhabitants. The Eastern Highlands fall into two climatic sub-divisions: the highlands of Guiana and Venezuela lie in the N. E. Trade Wind Belt, and are covered partly by the *Selvas* or *Montana* (equatorial forests) and partly by savana or grassland. The Brazilian High-

lands are partly in the N. E. Trades Belt, and partly in the rain-shadow of the edge of the plateau itself, which prevents the S. E. Trades from blowing inland; the south-



THE PRINCIPAL NATURAL REGIONS OF SOUTH AMERICA

eastern coastlands, however, are under the influence of the S. E. Trades. The vegetation therefore differs from dense equatorial forests to scrub. There are warm temperate forests in the south, where the soil is of volcanic origin and consequently rich. And this is naturally the best developed part of Brazil with its enormous production of coffee.

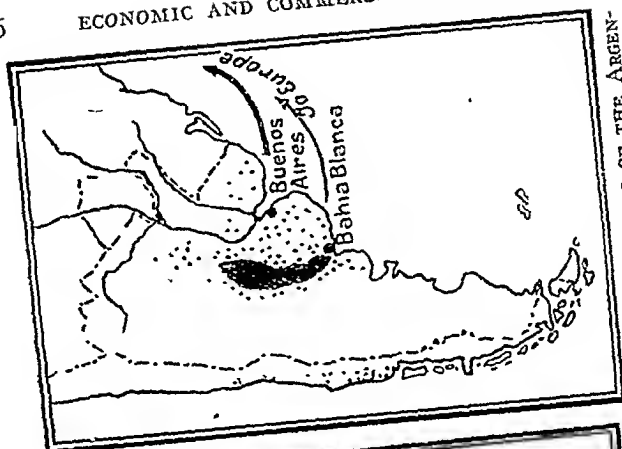
THE SOUTH AMERICAN STATES

BRAZIL is the largest state of South America, with an area of $3\frac{1}{4}$ million sq. miles. The total population in 1936 was 41·6 millions including 600,000 Indians. It falls into three broad divisions. (a) *The Amazon Basin*, as already noted, is the largest equatorial region in the world, but little developed as yet. The only product of note obtained from this region is *Para rubber*; but the production has diminished considerably owing to extensive exploitation in the past. The Amazon, with its numerous tributaries, affords practically the only means of communication with the interior. The river is navigable by ocean-going vessels of 10,000 tonnage up to a thousand miles from its mouth. Manaus is the collecting centre for rubber from the forests, and ocean-going vessels ply between this collecting centre and the port of Para at the mouth of the Amazon. (b) *The Brazilian Highlands* are believed to be rich in minerals, but the output at present is quite small. The bulk of world's *Monazite* comes from Bahia and other parts of Brazil. The production of *diamond* is now not very important. Large reserves of high grade *iron ore* lie in the state of Minas Geraes. There are rich reserves of *Manganese ore*. *Gold* is also mined. The coastal tracts, extending from the port of Para to Sao Paulo, are, however, fairly developed. The climatic conditions over this long but narrow sub-region

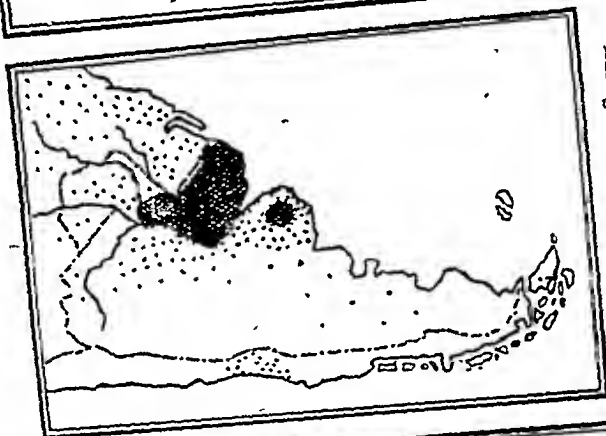
are naturally rather varied; in the north the climate is equatorial, in the south tropical; but everywhere it is tempered by oceanic influences. A corresponding variation in the products is also obvious: the chief crops of the north are *cotton*, *sugar-cane*, *rubber*, *cocoa*, *maize*, and *manioc*, those of the south are *coffee* and *cotton*. Half the world's total coffee is produced in the region around Sao Paulo (p. 102). (c) *The Parana-Paraguay Basin* occupies the southern portion of Brazil, which adjoins the territory of Uruguay. The chief product is *maté* tea; and this is the great *cattle-farming* area of Brazil. The capital and chief port of the republic is Rio de Janeiro. Farther south lies Santos, the chief coffee port. Pernambuco and Bahia or San Salvador are the ports of the northern part of the coastland along the Brazilian Highlands. Rio Grande do Sul, Pelotas, and Porto Alegre are minor ports along the coast of the Parana-Paraguay Basin; all these are accessible by vessels of small draught because of a bar at their entrance. The main line of inland communication is the great Amazon system; but most of the ports are connected by rail with the centres of production near by. The principal system of railways, however, is around Sao Paulo; there is thus direct railway communication between Sao Paulo, Rio de Janeiro, and Santos, and the system is linked with that of Uruguay. The inhabitants of Brazil are mainly of Portuguese descent, but there are large numbers of immigrants chiefly from Italy, Spain, Germany, Austria, and Russia. The native Red Indians are in hopeless minority. The principal items of export are *coffee*, *sugar*, *cotton*, *leather*, *cocoa*, *meat*, and *rubber*. And the imports consist mainly of *machinery*, *iron and steel*, *wheat*, *cotton goods*, and *coal*. The bulk of the foreign trade is with the U. S. A., and U. K.

Parana-
Paraguay
BasinCommuni-
cation

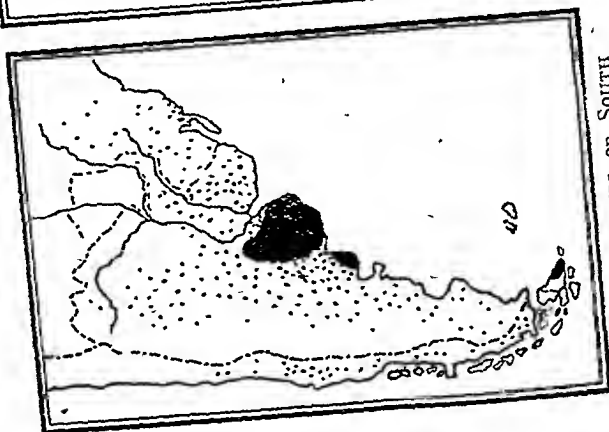
Trade.



THE WHEATLANDS OF THE ARGENTINE AND SOUTH AMERICA



THE CATTLELANDS OF SOUTH AMERICA.



THE SHEEPLANDS OF SOUTH AMERICA.

ARGENTINA is said to be the most progressive state of South America. It has an area of about 1,150,000 sq. miles. It occupies the greater part of the south, and has large tracts suitable alike in soil and climate for wheat. In the north it includes a part of the Parana-Paraguay Basin, covered largely by Tropical Forests, (Chaco lowlands) and not yet much developed, the only products being *maté* and *Jannin*. Then there is the rich grassland region, centred mainly on the La Plata River, the main estuary of the Parana-Paraguay, with a rather varied type of climate; the warmer and damper north-eastern parts of this region are suitable for *maize* and *flax*, the more temperate south-eastern parts eminently suited to *wheat*; this is also the principal *cattle-farming* and *sheep-rearing* region of South America; and Argentina, besides being one of the great granaries of the world, is also one of the principal exporters of meat to the great industrial countries of Europe. Lying between the grassland region and the Andes there is, again, a small area adjoining the Mediterranean lands of South America, and it serves as the *fruit* farming and *wine* producing region of the republic; some *sugar*, *cotton*, *tobacco*, and *hemp* are also produced in this warm sheltered region. South of the grassland, however, stretches the cool temperate desert of Patagonia, once believed to be of little economic value. But on the comparatively grassy slopes of the Andes there are rough sheep *pastures*, and what is more important, small *oilfields* have recently been discovered in the desert tracts including the Andean chain. It is found around Rivadavia on the coast of Patagonia mainly. The total output amounts to 15 million barrels. The capital and chief port is Buenos Aires on the River Plate; it lies in the region of the wheatlands of the Republic. Other ports of this region are La Plata, Rosario, and Bahia Blanca, all of which, including Buenos Aires, have been provided with

Parana-
Paraguay
BasinGrass-land
RegionMediterra-
nean
Region

Towns.

artificial harbours. Tucuman is the seat of the sugar industry, and Mendoza of wine industry. The Argentine is rather well served by railways. The Chil -Argentine Railway connects Buenos Aires with Valparaiso (Chil ), and a great network of railways join all the inland centres of production with the leading ports. Moreover, the Parana and Paraguay are—or have been made—navigable through Argentina to the state of Paraguay. The population of Argentina is 12.2 millions, consisting mainly of the descendants of the early Spanish settlers; but in recent years there has been a large influx of immigrants chiefly from Italy. The native Red Indians are as usual in hopeless minority, and they live chiefly in the northern tropical forests. The principal items of export are *wheat, maize, beef, hnsced, hides and skins, butter, mutton, and wool*. The foreign trade of the Republic has been showing a steady increase in value since the closing decades of the last century; the export trade has expanded nearly four times during the last three decades or so, the import trade has multiplied nearly five times. But all through this long period the balance sheet has never recorded an adverse trend,—there has always been an excess in the value of exports over imports.

PARAGUAY lies mainly between the Parana and Paraguay Rivers. It is quite a small republic north of the Argentine, and occupies a part of the tropical forests of that republic as well as a small stretch of grassland on the east of the Brazilian Plateau. The area is 161,000 sq. miles and population 900,000. Most of the country consists of a series of plateaus covered with grassy plains and dense forest in the east. The chief exports are *tobacco, maté* (Paraguay tea), *oranges, timber, and skins*. Timber, however, is the chief commercial

product, and *cotton* has made a good beginning. The capital is **Asuncion**, on the Paraguay River; it is accessible to small ocean-going vessels. The state is still very undeveloped and sparsely peopled, and the population consists mainly of Red Indian and half-castes of Spanish descent. There is railway communication between Asuncion and Buenos Aires (Argentina).

URUGUAY is another small republic occupying an area of 72,150 sq. miles; it lies between the La Plata estuary and Brazil. In general characters it resembles the rich grasslands of the Argentine. The principal products are *maize* and *wheat*; some *linseed* is also grown; and large areas are devoted to *cattle farming*. The chief items of export are *wool*, *meat*, and *hides and skins*; *wheat and flour* and *linseed* also enter into the export trade. The country has been rapidly developed, and the balance of the foreign trade is in favour of the republic. The capital and chief port is **Monte Video**, which has a finer harbour than Buenos Aires (Argentina), and the harbour has been considerably improved. Fray Bentos and Paysandu are meat-packing towns on the Uruguay. There are railways linking Monte Video with the meat-packing centres.

CHILE occupies a long narrow portion of territory on the west of the Andean Chain. The republic has an area of 290,000 sq. miles and a population of 4,300,000. It readily falls into three well-defined regions: (a) *The Northern Desert* (Atacama Desert) is economically valuable for various minerals, especially *nitrates*, *copper*, *silver*, and *gold*. (b) *Mediterranean Region* occupies the heart of the country. The chief products of this region are *wheat*, *barley*, and various *fruits*, and also *wine*. Large tracts are devoted to *cattle* and

sheep. (c) *The Forest Region* of the south is essentially a *dairy farming* and pastoral country. But the region is very sparsely populated owing to extremely heavy precipitation and the lack of suitable land for settlement. It is interesting to learn that it is only in the region of Chile in the whole of South America that a small *coalfield* has been discovered. The capital is **Santiago**, and its port is **Valparaiso**; both of them are in the Mediterranean region of Chile. Valparaiso is the main port of imports. Iquique and Antofagasta, both in the Desert Region, are the leading ports for export, the bulk of which naturally consists of nitrate and guano. *Nitrate of soda* and *copper* together while nearly 67 per cent of the imports consists of various manufactures. The balance of the foreign trade is in favour of the country.

BOLIVIA is a large but rather undeveloped inland state. Its western region is remarkable for the elevation of the Plateau of Titicaca, comparable only to that of Tibet. It is rich in minerals, especially *tin*, *copper*, and *silver*. Bolivia is said to contribute nearly a quarter of the world's total output of tin, and the wealth of the country comes almost solely from its minerals. The eastern region gradually slopes down to the Amazon Basin, and has the same type of vegetation on the whole. The population is about 3 millions, nearly two-thirds of which consists of Red Indians. The capital is **La Paz**, situated in the plateau region near Lake Titicaca. But **Sucre** on the east is the legal capital. Bolivia has no port and no coast-line. But La Paz has direct railway communication with the port of Arica (**Chilé**); this is the shortest sea-connection, although the minerals are sometimes exported also through the Chilean port of Antofagasta or the Peruvian port of Mollendo. The natural outlet of the

eastern region of Bolivia is through Brazil by river or through Argentina by railway. Beyond the Andes, however, there is a large tract of territory in the Gran Chaco, for the possession of which Bolivia and Paraguay waged a long but indecisive war from 1932 to 1936, because the region is believed to be rich in oil.

PERU lies north of Chile, and falls into three divisions: (a) *The arid coastal region* where cotton and sugar-canes are grown on tracts irrigated by the waters of the Andean rivers; (b) *The Sierra*, an agglomeration of valleys and tablelands enclosed by the Andes, where the only crop is *quinou*, a native cereal, if occasional barley and other crops be left out of consideration; (c) *The Montana* on the eastern slopes of the Andes, where the only notable product is *rubber*. But the Andean region is rich in minerals, especially *copper* and *silver*; some *oil* is also obtained from the northern part of the coastal strip and here we find the llama and the alpaca yielding valuable *wool*, and the llama also serving as a transport animal. The capital of the republic is Lima, and its port is Callao. *Mollendo*, though in Peru, serves mainly as the port for Bolivia. The principal items of export are *sugar*, *petroleum*, *metals* and *ores*, *llama*, *vicuna* and *wool*.

ECUADOR is a small country north of Peru, and lies across the Equator; hence the name of the country. The country falls into two broad divisions: (a) *a coastal strip* producing *cocoa* as the chief commercial product; and (b) the *Andean plateau* which covers the greater part of the country. Another important product is *mineral oil*. The capital is Quito, almost on the Equator, but being on a height of 9,000 feet it is the abode of perpetual spring. The principal port is *Guayaquil*.

COLOMBIA lies north of Ecuador, at the northern end of the principal chain of the Andes. The coastal plains and the main valleys lie between the Andean Chains. The most notable of the valleys are those of the Cauca and Magdalena. The climate is equatorial, and the chief products are *cocoa*, *sugar*, *cotton*, and *bananas*. On the slopes of the mountain spurs grow *coffee* and *maize*, on higher elevations, *wheat*. The mountainous tracts are rich in minerals, including *gold* and *silver*; and important *oilfields* have recently been discovered near the coast. The capital is Bogota, and the leading ports are Cartagena and Baranquilla. Medellin is a large mining centre on the Andes. The Magdalena and Cauca serve as the main highways.

VENEZUELA lies north-east of Colombia, and consists of a number of natural regions: (a) *The Coastal Plains* of the north are important for *cocoa* and *sugar*, and the recently discovered *oilfields* around the shallow gulf of Maracaibo. (b) *The Coastal Range*, actually an offshoot of the Andes, where the chief products are *coffee* and *maize*. (c) *The Llanos* or grassy plains of the Orinoco Basin is a region sparsely peopled but largely devoted to *cattle* and *horses*. (d) *The Guiana Highlands* are still in an undeveloped stage. The capital of the republic is Caracas, and its port is La Guayra. There is railway connection between the two. Valencia is another inland town, and its port is Puerto Cabello; these two are also connected by rail. With the increase in the output of *oil* the country has been developing rather rapidly; about 75 per cent of the total export has consisted of oil since 1926; prior to that *coffee* was the leading export. The foreign trade has been showing a progressively favourable balance since 1923.

THE GUIANAS lie east of Venezuela. The region is believed to be rich in minerals especially *gold* and *diamonds*, but the output at present is small, and the whole region still lies in an undeveloped state. It is divided into a region of lowlands and a region of plateau. The minerals are from the plateau regions, while the agricultural products such as *sugar*, *rice*, and *cocoa* are the products of the lowland regions. The capital of British Guiana is Georgetown; that of French Guiana Cayenne; and Paramaribo is the capital of Dutch Guiana or Surinam.

Regions
and
Resources.

DIVISIONS

TRINIDAD is a small island off the mouth of the Orinoco River. It is a British possession, and the largest producer of *petroleum* in the British Empire. There is the famous pitch lake, from which *pitch* or asphalt is obtained for road making.

THE FALKLAND ISLANDS, to the east of the Straits of Magellan, also belong to Great Britain. The climate is damp and foggy, and the rearing of sheep and cattle forms the chief occupation of the people. The island of South Georgia is an important whaling base.

STUDIES AND QUESTIONS

1. What are the main sources of exportable commodities in Chile, Argentina, and Brazil? 'The main exports of these countries show contrasts largely dependent on climatic differences in the three areas.'—Elucidate this statement.

2. Give a general description of the Amazon Basin. What possibilities of commercial development the region may have?

3. Give an account of the foreign trade of South America. (C. U., Inter., '45).

4. Discuss the nature of trade between India on one side and South American states of Brazil, Argentina, and Chile on the other. In what way do you expect this trade to be modified in the near future? (C. U., B. Com. '35),

CHAPTER III

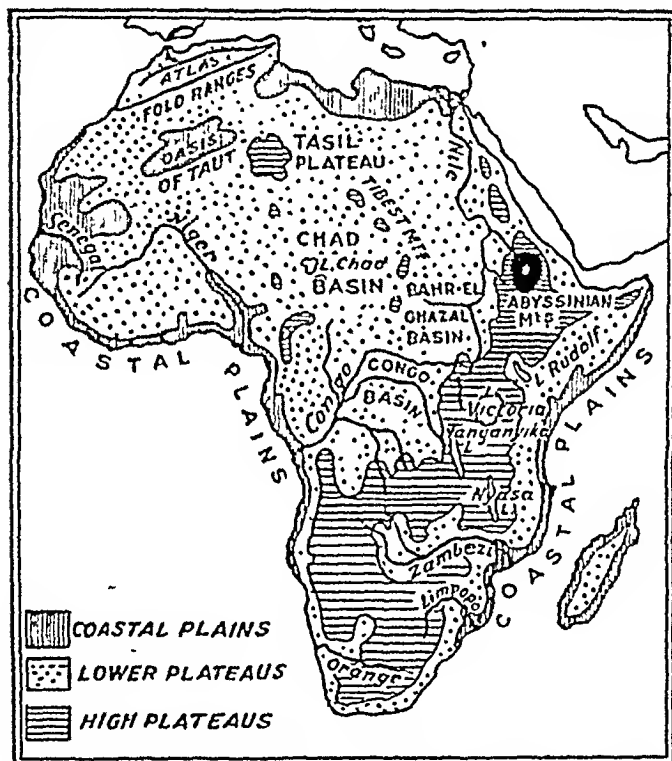
AFRICA

The Dark Continent

Position and Size.—Africa, with a total area of some 11,000,000 sq miles, is next to Asia in size. By far the greater part of it lies within the Torrid Zone; for the Equator cuts it almost in half, and both the Tropics pass over the mainland. Its central meridian is longitude 20°E . For its size, however, it has quite a short coast-line—only about 19,000 miles long.

Physical Features.—In its general build, Africa resembles the small continent of Australia. With the exception of the small chains of the **Atlas Mountains** in the north-west, the whole of this vast continent is formed by a plateau surrounded at intervals by narrow coastal plains. The Atlas, we have already seen, is a series of fold mountains belonging to the Alpine System of Europe, or from a broader perspective it is a part of the great Alps-Himalayan System of Eurasia. And indeed from a meteorological point of view, too, the northern fringes of Africa belong to the great land mass of Eurasia. The higher elevation of the plateau is in the south as it is in Peninsular India and the lower elevation in the north. Actually, however, it is not a single plateau, but a series of plateaus of varying elevation. The Plateau of South Africa reaches as far north as the upper and lower courses of the River Congo, which, in its middle course, makes a long detour towards the north. The South African Plateau then sends out various branches over the lower plateau in the north. In

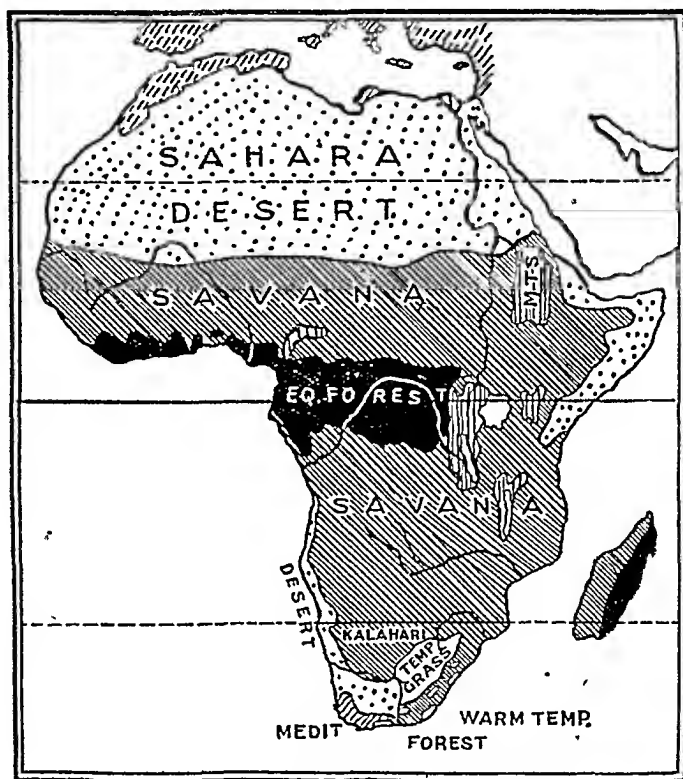
the north-east are the Abyssinian Mountains, from which, as from a mountain knot, are given off a number of folded mountains (not Alpine chains) towards the south. The Drakensberg Mountains, actually the highest edge of the southern plateau, lie south-east.



THE PHYSICAL FEATURES OF AFRICA

Climate.—Africa is the only continent cut in half ^{Basic} by the Equator. So when it is summer in North Africa it facts is winter in the south, and *vice-versa*. During the northern

summer (May-Oct.) the Sahara Region gets very hot owing to the movement of the sun towards the Tropic of Cancer, and North Africa lies under the N E. Trade Wind Belt. As these winds blow mainly from a land surface they can



THE NATURAL VEGETATION OF AFRICA

bring no rain. But owing to the northerly swing of the world's wind systems, the S E Trade Winds shift northward, and the south-west extremity of the continent,

where it is then winter, receives its share of moisture from the N. W. Anti-Trades. And owing to the severe heat over the Sahara region the hot air rises and draws in a deflected branch of the S. E. Trades across the sea so as to cause heavy showers all over Central Africa. This deflected branch of the S. E. Trade Winds may as well be described as monsoon winds. During the southern summer (Nov-April) the wind systems swing southward, so that the S. E. Trades cover the whole of South Africa and bring in heavy showers; but the south-west extremity falls in the rain-shadow of the eastern mountains. At this season the N. E. Trades shift farther south in North Africa, where it is still very dry; but the north-west extremity comes under the influence of the rain-bearing S. W. Anti-Trades. Central Africa, however, is a region of rainfall all the year round, and as is only natural for all Equatorial regions it, too, is a land mass of convectional rains.

Natural Vegetation.—These climatic conditions are beautifully reflected in the natural vegetation of the continent: (a) *Equatorial Forests* occupy the Congo Basin and the Guinea Coast where it is always 'hot and wet.' (b) *Tropical Grasslands or Savanas*, with rain in summer and drought in winter, cover both sides of the Equator as far north as the Kalahari Desert. (c) *Deserts* cover enormous tracts in Africa and occur on the borders of the Savanas. (d) *Mediterranean Vegetation* likewise occurs on the borders of the deserts in the north as well as in the south. (e) *Warm Temperate Forests* are found only in the south-east. (f) *Temperate Grassland*, known as the veld, covers the south-eastern part of the high Plateau of South Africa. (g) *Mountain Vegetation* occurs in the Abyssinian Mountains.

THE ATLAS REGION

The Barbary States occupy the north-west of Africa. Along this region run the mountain chains of the Atlas; and each of the three states is divisible into three parts—(a) *The Coastal Plains*; (b) *The plateau bounded by the principal chains of the Atlas*; and (c) *The Plateau of the Sahara*. The climate is Mediterranean throughout.

MOROCCO is the westernmost state of the three. It is a Sultanate under French protection. The chief agricultural products of the fertile coastal plains are *barley*, *wheat*, *maize*, and various *fruits* such as olives, oranges, vines, figs, etc. *Date-palms* are grown in the oases of the Sahara region; and the chief forest products obtained from the plateau enclosed by the Atlas chains are *cork* and *cedar*. In this plateau region sheep are reared, and there are numerous cattle in the plains. The capital is Marrakesh or Morocco; but the chief town and port is Casablanca. Fez is an important inland trade centre. The exports consist chiefly of *eggs*, *wheat*, *barley*, *almonds*, *wool*, *linseed*, and *fez cap* and *leather*. The trade is chiefly with France and Britain, but fez caps and leather go mainly to other parts of Africa. The imports, however, exceed the exports by more than double the value.

A small area of Morocco, including the port of Ceuta, however, belongs to Spain.

ALGERIA is a French Colony. Its products are similar to those of Morocco, and it has important *fisheries* along the coast. Mining is important, especially of *iron ore* and *phosphate*. The principal towns are Algiers, the capital and Oran—both ports. The chief items of export are *wine*, *sheep*, *wheat*, *tobacco*, and *minerals*. The trade is mainly with France.

TUNIS is also a French Protectorate. Its capital is Tunis. Agriculture is the predominant industry but minerals including iron ore and phosphates are also found

For the development of this region the French have built a number of railways, which connect nearly all the important towns such as Casablanca, Fez, Oran, Algiers, and Tunis, and at the same time penetrate into some of the oases of the Sahara

Communi-
cations

THE NILE BASIN

THE SUDAN lies between Egypt and Uganda, and is under the joint control of Egypt and Great Britain; hence the name *Anglo-Egyptian Sudan*. It, too, is a 'gift of the Nile,' though in a somewhat modified sense; the rainfall is low, and but for the waters of the Nile the whole tract, covering as it does an area of more than 1,000,000 sq. miles, would be a desert. Large stretches of land have been irrigated, especially since the construction of the *Sennar Dam* in 1925. The climate is suitable for a great variety of crops, especially *cotton*, and the soil has also been made suitable for them. Large tracts are now actually under cotton; for the British Empire is now trying hard to be self-sufficient in respect of this valuable commodity. In clearings in the southern forest regions coffee, Sisal hemp and Maize are grown. In the grasslands cattle, sheep, mules and camels are reared. Millet, tobacco and groundnuts are also grown. Dates are plentiful. The principal town is *Khartoum*, and the chief port is *Port Sudan*. There is railway connection between the two. The principal exports are *cotton*, *gum* and *millet*. The bulk of the trade is with Britain

Character-
istics

Products.

Trade.

EGYPT is theoretically independent, but actually under British protection. It, too, is a vast country with a total area of 383,000 sq. miles; but the habitable territory of the country is no more than only 12,000 sq. miles in area. The population is 14,200,000. Long, long ago, Herodotus called it 'the Gift of the Nile'. Leaving the great desert waste, we may divide Egypt into two natural divisions: (a) *Upper Egypt* and (b) *Lower Egypt*. Upper Egypt is actually coincident with the Nile Valley, and Lower Egypt with the *Nile Delta*.

The habitable area of Egypt is limited to the tracts that are capable of being irrigated by the waters of the Nile. The annual rise of the water in the Nile keeps alive the agriculture of Egypt. The river begins to rise by the end of June and by the end of September reaches the top of the banks and begins to overflow except where restrained by artificial dykes. In upper Egypt the river on rising is allowed to fill large closed basins, the water being run off again by sluices at the end of about seventy days. The defect of this method is that the ground remains unproductive for half the year. In the lower and middle Egypt perennial irrigation is practised. High embankments are raised to confine the river in flood and high-banked canals conduct the water into the irrigation basins. Valuable crops that require a longer period to mature are grown here. But for the Nile, Egypt would have been a vast tract of barren, sandy land devoid of human habitation. Even now, if the rise of the Nile is too high or low, famine breaks out in a greater or lesser degree.

The length of the Nile measured from its source is about 4,060 miles. It draws water from two main sources; first the Equatorial Plateau, where the reservoirs are Lakes Victoria, Albert and Edward; secondly S. W. Abyssinia.

where the Blue Nile (Bahr-el-Azrak) and Atbara are the most important affluents. The river enters Egypt at Wadi Halfa. The autumn floods of Egypt are due almost entirely to the contribution of the Blue Nile. The Delta is a monotonous plain with its greatest width—150 miles—between Alexandria and Port Said and extends 100 miles from North to South.

The Valley has a desert type of climate, with extreme Climate. ranges of temperature both diurnal and seasonal. Hot, dry and dust-laden wind (*Khamsin*) blows outwards from the desert area towards the sea. The Delta enjoys a Mediterranean type of climate and has some rain in winter.

Egypt is a country of small land-owning agriculturists. Agriculture. Normally, the agricultural year is divided into three seasons, winter, summer and "Nili" (the period of Nile flood). In the delta region it is possible to grow crops all the year round by means of irrigation. Cotton and sugarcane are the summer crops. Rice and Maize are cultivated in the "Nili" period. Wheat, beans and clover are the usual winter crops. In the oases of the desert areas, the only product is dates. Cotton is by far the most important crop and the only "cash" crop of Egypt. Some tobacco is also grown and cigarettes are manufactured. Weaving of cotton goods is carried on for supplying local needs. The bulk of the cotton crop is exported.

Egypt is poor in mineral products. Manganese is Minerals mined in the Sinai peninsula. A little oil has been found in the Red Sea area. Phosphates are obtained from Isua and Kosseir.

Egypt cannot grow enough food for her big population and imports food-stuffs as well as wood, coal, textiles and iron and steel manufactures. The principal exports are cotton and tobacco. Raw cotton forms nearly nine-tenths

Trade and
Trade
routes.

of the exports of Egypt. Cotton seeds are also exported. About 50 per cent of the trade is with Great Britain

The Nile is very important as a waterway. It is navigable as far as Aswan and there are about 15,000 sailing vessels on the river. All roads and railways follow the Nile Valley. The main railway line runs from Alexandria southwards as far as Aswan. From Cairo, lines run to Damietta and to Port Said and Suez. The Suez Canal is of vital importance to Egypt though it hardly affects her trade. The Imperial Air Route serves all the important towns of Egypt. Cairo has become an air port of major importance.

ABYSSINIA is an undeveloped mountainous country having an area of 350,000 sq. miles. The climate is tropical and the maximum rainfall is in summer, which is due to monsoonal effects. Transport is extremely difficult by rail or river as the high land is deeply cut by Blue Nile and Atbara gorges. The commercially backward condition of the country is mainly due to the difficulties of transport.

The chief industries of Abyssinia are pastoral and agricultural. Cattle, sheep and goats are numerous. The horses of the country are small but hardy, and make excellent polo ponies; mules are bred, being used as pack animals; donkeys are also small and serve as baggage animals. Cotton, sugar-cane, date palm, coffee and vine thrive well in many districts, and, except coffee (long berry Mocha) production is on the increase. The native produce includes hides and skins, wax, barley, millet (dhura), wheat, gesho (which serves as a substitute for hops), and tobacco, but, with the exception of hides, skins, wax, grain and coffee, production is inadequate for export. Manufacturing industries are practically non-existent. The forests abound in valuable trees including rubber. Iron is found in

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FAST AFRICA

East Africa is divided between Britain and Portugal.
The whole region consists of two broad physical units:
(a) *The Plateau* (which is actually a part of the high plateau of Africa) and (b) *The Coastal Plain*. The whole Natural region lies in the tropics, and has abundant rainfall. But regions
he Plateau Region, usually quite high, has a pleasant climate, and a moderate rainfall. Moreover, the soil is often

rich And the region is suitable for *maize* and *cotton* as well as for *coffee* and *sisal hemp*. It is also suitable for cattle. The Coastal Region, on the contrary, is hot and humid and often covered with mangrove swamps It is suitable for *rice*, *cocoanuts*, *rubber*, *sugar*, and *spices*.

UGANDA is a British Colony, south of the Sudan It lies wholly within the plateau region The principal commercial product is *cotton*

KENYA lies east of Uganda. It is also a British Colony. It is divisible into two parts—plateau and coastal plain The chief products are *cotton* and *coffee*, besides *maize* and *millet*. Mombasa is the chief port of Kenya and Nairobi an important inland town

TANGANYIKA lies south of Kenya. It is a British Protectorate, wrest from the Germans. Dar-es-Salaam is the chief port

NYASALAND, farther south and inland, is also a British Protectorate. Zomba is the capital.

PORTUGUESE EAST AFRICA is formed entirely by coastal lowlands, and its southern end lies outside the tropics Beira and Lourenco Marques are its ports; the latter serves as the main outlet for Transvaal, South Africa

ZANZIBAR and PEMBA are two islands under British protection The chief town, Zanzibar, is a busy trading centre and port, noted for *spices*.

SOUTH AFRICA

South Africa consists of the Union of South Africa, a British Dominion, and a number of native states under British protection such as Basutoland, Swaziland, and

Bechuanaland. The British colonies of Northern and Southern Rhodesia may also be included in this division

THE UNION OF SOUTH AFRICA occupies the greater part of South Africa, and consists of the four provinces of the Cape of Good Hope, Natal, the Orange Free State and the Transvaal. Almost the whole of the Union is in the warm temperate belt. Over much of the Union summer temperatures are pretty uniform and low for the latitude. Winters are everywhere warm. Frosts are rare and never severe. The plateau, however, experiences colder winters than the coastal areas. Most of the Union receives its rainfall in summer during the prevalence of the S. E. Trade winds. The eastern and southern coastal areas receive the largest amount of rain. The highlands prevent much rainfall from getting inland, and the Karoos are relatively dry. The small Mediterranean region in the S. W. gets winter rainfall. On the south coast there is a narrow strip which receives rain both summer and winter. The N. W. and western parts are dry regions.

As a whole, the Union is a country of poor rainfall. Actually half of it receives annually a precipitation of only 15 inches. Moreover, the rainfall is very irregular. It has been found that successively two or more years have passed without even a small rainfall on this vast portion of land. As the natural watering has got no regularity, so it is vitally important to irrigate the country. South Africa has got no artesian basins such as are found in Australia, still it has a good source of water supply. The supply is not found on the level of land but is at a depth from the surface, so to utilise this water for irrigation it is required to pump up the water from below with the help of windmills. This is the way by which a large number of farms are regularly getting their water supply. This system is seen to be

introduced with much gain over the Karroo and High Veld. In this Union there are a number of rain-catchment dams and river dams as well, from which steady water-supply is carried out here. The important river dams are: Hartebeestpoort Dam (Crocodile River) north of Pretoria, Sundays River north of port Elizabeth, Kamnassie River near Oudtshoorn, Tarka River (tributary of the Great Fish River) near Cradock, Great Black River near fish River Hation. These are the chief sources from which the Union of South Africa—the land of scanty rainfall—is irrigating the fields for the growth of crops.

The whole area naturally falls into two broad divisions: (a) *The Plateau*, containing the Stormberg and Drakesberg Mountains (these are really the highest edges of the plateau), and (b) *The Coastal Lands*. Since the plateau descends to the coastal lands by a series of steps, the latter again falls into two subdivisions: (i) *The Karoo*, i.e., the series of steps, and (ii) *The Coastal Plain*. With the exception of the south-western part where the climate is Mediterranean, the whole of this territory has rainfall in summer. But the lower surface of the plateau is in the rain-shadow of the Stormberg and Drakesberg Mountains. The slope is from east to west. The whole territory of the Union can thus be divided into a number of natural regions: (a) *The Mediterranean Region* of the south-west coast-lands around the port of Cape Town. The principal products of the region are *wheat*, *barley* and a variety of *fruits* such as oranges, grapes and peaches. Naturally therefore fruit-tinning, wine-distilling, and the preparation of jam are the important industries of this region. (b) *The Karoo*, subdivided into the Little Karoo and the Great Karoo, occupies the area lying between the Mediterranean coastal tracts and the High Plateau of South Africa.

Owing to low and uncertain rainfall and the consequent poverty of vegetation this is a region of sheep farming.

(c) *The Warm Temperate Forest Region* of the south-east coastlands is a region of summer rain. The principal crops are *maize* and *corn*, *sugar-cane*, and *tobacco*.

(d) *The Field or Temperate Grassland* of the south-east highlands lie between the south-eastern coastlands and the edge of the high plateau, covering the greater part of Natal, and the Transvaal, the whole of the Orange Free State, and the eastern part of Cape Colony. Large tracts are, however, covered by forests, yielding timber of some value. In the grasslands sheep farming and cattle farming are important. Much *wool* from this region is exported to England every year. But the region is very rich in mineral wealth. Coal is mined near New Castle and Johannesburg, and exported through the ports of Durban and Lourenco Marques. Half the world's total annual output of gold is mined at the Witwatersrand near Johannesburg. And there are the large diamond mines of Kimberley and Pretoria. The Union is easily the greatest Gold and Diamond producing country of the world.

(e) *The Desert Region* occupies the western half of the plateau and extends as far west as the coastlands. Agriculture including live-stock rearing and mining are the most important industries of S. Africa. Manufactures are not much developed. Manufacture of wine and brandy, fruit-canning, meat-packing, sugar-refining, etc., are the most important. There are a number of railway workshops also. The Iron and Steel industry of S. Africa is said to have developed considerably as a result of the last Global War. There has been a marked increase in the production of agricultural implements and machinery. The woollen industry is also developing.

The Union has about 13,000 miles of railways. The railways are of enormous importance to the country as there are no navigable rivers. The main line runs from Cape Town to Kimberley and thence to Bulawayo in S Rhodesia. A second main trunk line from Port Elizabeth runs roughly parallel to the Cape line via Bloemfontein to Johannesburg and Pretoria. Another line runs from Durban to the interior of the plateau. From Lourenco Marques a railway runs to Johannesburg, which is a focus of railways.

The exports of the Union are consistently higher in value than the imports. Among the exports mining products are dominant. *Gold* is by far the most important export, and *diamond* and *coal* account for most of the remainder of the value of mineral exports. Among the agricultural products exported, *wool* is the most important. Maize is the next largest item. *Hides* and *Skins*, *sugar*, *mohair*, *wine*, *fruits* and *dairy products* are the other large items. The leading imports are food-stuffs, machinery, textiles, chemicals, mineral oil, motor cars, etc., etc. The bulk of the trade is with the United Kingdom.

Cape Town is the capital and chief port of the Cape of Good Hope. Port Elizabeth, on Algoa Bay, is another important port of the province. East London on the Buffalo River, is a rising port. Simon's Town is the naval station of the Union. Pietermaritzburg is the capital of Natal, and Durban its chief port. Bloemfontein is the capital of the Orange Free State. Pretoria is the capital of the Transvaal; but Johannesburg is the largest town.

RHODESIA, now divided into the two British colonies of Northern Rhodesia and Southern Rhodesia, lies in the plateau region. But the land is said to be

erable, especially in the valleys of the rivers Limpopo Divisions. and Zambesi; and it is suitable for sheep and cattle also. The territories are not yet developed in any sense, although agriculture and mining are practised there. The population is exceedingly small. The whole territory is said to be rich in minerals: there are valuable copper mines and coal deposits in Northern Rhodesia; Resources and in Southern Rhodesia there are gold mines. The natural outlet of Rhodesia is the Portuguese port of Beira

ANGOLA is a Portuguese possession. The territory is said to be suitable for cattle farming. Lobito is the port, and Loanda the capital.

THE BELGIAN CONGO occupies the greater Extent part of the Congo Basin, which is the most notable Equatorial region in the world after the great Amazon Basin of S. America. It is a hollow-shaped plateau drained by the Congo and its tributaries which have their sources generally in the mountain fastnesses of the high plateau of South Africa. Owing to the unbearable humidity of the atmosphere the lowlands are covered with dense equatorial forests and the uplands with savana or grassland. The typical products of the forests are *rubber*, *oil palm*, *palm kernels*, and *copal*. The Congo forests are the homelands of numerous herds of elephants, and one of the most important product of the region is, therefore, *ivory*. In the interior is the Katanga region, a southern appendage of the Belgian Congo, believed to be rich in mineral reserves, especially in copper. Elisabetheville, the metropolis of Katanga, is the chief centre for the mining of copper. There are iron and lime also in close proximity to the copper fields. Other

Characteristics.

Products

Resources.

minerals worked are gold, tin, and diamonds. Katanga lies close to Rhodesia, and indeed from the geographical point of view it is more a part of the latter than of the Belgian Congo. Coal and foodstuffs for the miners are, therefore, obtained from Rhodesia. The capital of the Belgian Congo is Boma; it is also a port of importance. Matadi, about 100 miles from the sea, is another important port accessible by ocean-going vessels. Leopoldville and New Antwerp (formerly Bangala) are important towns. There are railway communications between Matadi and Leopoldville.

THE GUINEA COAST

The Guinea Coast is divided amongst Britain, France, Portugal, and Spain; but there is a small Negro republic also. The whole of this region may be divided into two physical units: (a) *The Plateau Regions*, and (b) *The Coastal Plain*. The Plateau Regions have a comparatively light rainfall and a poorer soil covered by savana or grassland. The principal food crops of this region are *millet*, *maize*, *rice*, and *ground-nuts*. *Cotton* is also important. Minerals sometimes occur as, for example, gold and manganese in the Gold Coast; and tin and coal in Nigeria. The coastal plain has a heavy rainfall and a hot damp climate. In the damper parts the typical vegetation is evergreen equatorial forest, in the drier parts occur deciduous forests. The principal forest products are *mahogany*, *ebony* and other hard timbers, *wild rubber*, *oil palm*, etc. There are rubber plantations as well, and large quantities of *cocoa* are also produced. *Rice*, *manioc*, *maize*, and *cocoanuts* are also cultivated.

LIBERIA is a Negro Republic founded in 1820 for the liberated slaves. The territory is undeveloped. Monrovia is the capital.

GAMBIA is a small British Colony of only 4 sq miles; but the Protectorate has an area of about 4,000 sq miles. The capital is Bathurst. The exports consist of *rubber, cotton, hides and ground-nuts.*

SIERRA LEONE consists of another British Colony and Protectorate. Its exports are *rubber, palm oil* and allied products. Freetown is the capital and chief port; it is a coaling station, and has a good harbour.

NIGERIA also consists of a British Colony and a Protectorate. Its chief products are *rubber, palm oil, cocoa, cotton, coffee, gum, etc.* The capital and chief port is Lagos.

GOLD COAST also consists of a British Colony and a Protectorate. The chief exports are *palm oil, rubber* and *cocoa* (nearly half the total world supply). Gold, diamond and manganese are minerals exported. The bulk of the trade is with Britain. The principal port is Accra.

FRENCH WEST AFRICA includes all the territories from Cape Blanco to the Congo, with the exception of those under other European Powers. The principal units are Senegal, with its capital of Fort Louis; Dahomey with its capital of Porto Novo; and that indefinite territory known as FRENCH EQUATORIAL AFRICA extending upto the Nile Basin. All the possessions are economically undeveloped. Senegal is commercially the most important. The main exports are *groundnuts, palm oil, hides and skins, rubber, cotton, fruits and timber.* Dakar is the prin-

capital port of Senegal and capital of Fr. West Africa. St. Louis is also another important port.

ISLANDS OF AFRICA

Madagascar is one of the largest islands in the world. It is a French colony. The island consists of a plateau in the centre, surrounded by coastal plains. It is covered with dense forests, from which *rubber* is obtained. *Hides* are exported. The capital is Antananarivo. It is covered with dense forests, from which *rubber* is obtained. *Hides* are exported. The capital is Antananarivo.

Mauritius, St. Helena, and Ascension belong to Britain. The French island of Reunion lies near Mauritius.

STUDIES AND QUESTIONS

1. "Egypt is the gift of the Nile"—Discuss.
(CU, Inter 1939, '42).
2. Carefully examine the geographical position of Egypt in relation to world trade routes. (CU, B Com 1931, Inter 1941)
3. Discuss the present economic condition of South Africa with special reference to its (a) mineral resources (b) pastoral industry
(CU, B Com 1927, 1933, Inter., 1946)
4. What commercial interests induced Britain to colonize in Africa?
(CU, Inter, 1940).
5. Discuss the present position of the economic development of Abyssinia
(CU, B Com, 1936, '39).
6. Describe the present development of irrigation in S Africa and examine its possibility.
(CU, B Com, 1931)
7. Mention the economic resources of the British possessions in Equatorial Africa. What are the prospects of developing these resources and how will the Indian trade be affected by this development?
(CU, B Com, 1928)

CHAPTER IV

EUROPE

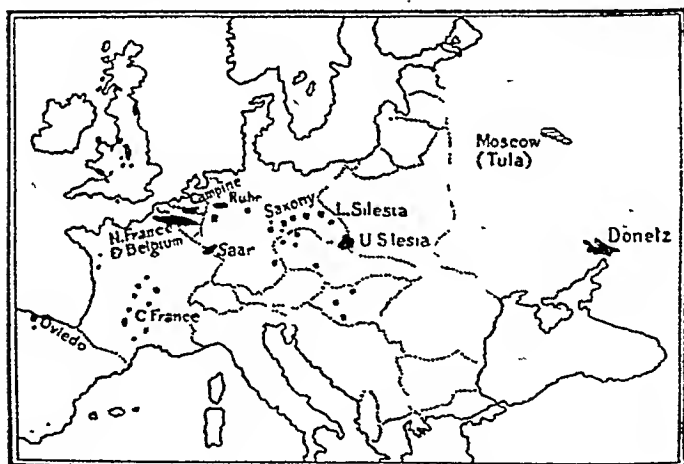
The Cradle of Western Civilization

Position and Size.—The continent of Europe is ^{Area} actually a peninsula of the greater land mass of Asia—a mere appendage. With the exception of Australia, it is the smallest of the continents, the area being 3,760,000 sq. miles. It has a westerly situation, and nearly the whole of it (except a small fragment in the north) lies within the Tem- ^{Location.} perate Zone. The coast-line is relatively the longest—nearly 20,000 miles, i.e., there is one mile of coast to every 190 miles of surface. No part of Europe is thus even 1,000 ^{Coastline.} miles from the sea.

Physical Features.—Although quite small in area for a continent, Europe has a fairly varied topography. At least three broad divisions may be distinguished:

1. The Mountain Regions of the North, comprising the Scandinavian Mountains, the island of Iceland, the <sup>Scandi-
navian,
Highlands,
Iceland,
N. Ireland.</sup> Highlands of Scotland, and the mountains of Northern Ireland.
2. The Great European Plain, stretching from the lowlands of Sweden to the border of the Black Sea, and <sup>Sweden to
Black Sea,
France to
Urals.</sup> from Western France to the Urals. Besides the Great European Plain, two of the most important plains are the Plain of Hungary and the Valley of the Po.
3. The Alpine Region of Southern Europe, actually a complex of plateaus and enclosing fold mountain chains.

The central mountain knot here is formed by the Alps, from which a number of chains are given off in all directions to form the Appennines of Italy; the Sierra Nevada, the Pyrenees, and the Cantabrian Mountains of Spain, the Dinaric Mountains, the Carpathians, the Transylvanian Alps and the Balkan Mountains of the Balkan Peninsula; and the Jura Mountains on the north-west of the main mountain knot of the Alps. The Appennines after entering the island of Sicily are continued as the Atlas chains of North Africa. Between the Cantabrian and Pyrenees on the north and the Sierra Nevada on the



THE COALFIELDS OF EUROPE

south lies the plateau of Spain and Portugal, called the Meseta. North of the Pyrenees lies the Central Plateau of France. The Bohemian Plateau lies enclosed by a mountain chain north of the Alps-Carpathian chain. And then there are the small plateaus of the islands of Corsica and Sardinia.

Geology and Minerals.—The geology of Europe is not so complicated as that of Asia, and what is more important still is the fact that it has been studied much more thoroughly than that of any other continent as many of the geological terms—Caledonian, Cambrian and Alpine earth movements, for example,—clearly indicate. Broadly speaking, the mountain masses of Northern Europe consist of ancient crystalline rocks resistant to later Alpine folding. And some of the southern plateaus are also of the same composition. The Alpine chains are, of course, of tertiary fold sediments. The mineral resources of Europe have already been described incidentally in previous chapters and they will be more systematically dealt with under different countries. Geology.
Mineral Resources.

Climate.—Climatically Europe is exceptionally fortunate in her westerly situation; for the entire continent lies in the Westerly Wind Belt in winter, and even in summer a comparatively large portion of it is under the influence of the Westerlies. Moreover, the warm North Atlantic Drift flows along the western coasts of the continent, keeping the whole seaboard warm and free from ice in winter. But, of course, it is then colder and colder on the mainland, though in a modified degree in comparison with the conditions prevailing in Central Asia. With the advent of summer, however, this state of affairs is modified: with the gradual swing of the wind systems towards the north as the sun progresses towards the Tropic of Cancer, Southern Europe falls outside the Westerly Wind Belt, and forms part of the high-pressure belt from which the North-East Trade Winds begin to blow westward. Thus the Mediterranean Region of Europe is dry in summer. But the whole of the continent being under the influence of the Westerlies, the Mediterranean Region receives its share General facts
Conditions in winter.
Conditions in summer.
Rainfall.

of rainfall in winter; and the rest of the continent have rainfall all the year round, although each place has its own seasonal maximum. The broad climatic zones into which Europe can be divided as well as its natural vegetation have been indicated elsewhere.

NORTH-WESTERN EUROPE.

THE BRITISH ISLES consist of two large islands, Great Britain and Ireland, together with innumerable smaller islands of varying size off the north-west coast of Europe. Great Britain comprises England, Wales, and Scotland which together form a single kingdom, while Ireland is divided into the two political units of Northern Ireland and the Irish Free State or Eire. The term, United Kingdom, now means the United Kingdom of Great Britain and Northern Ireland. The total area of the British Isles is about 121,000 sq. miles—roughly the same size as that of the Bombay Presidency. But England, the largest country in the British Isles, is smaller than Assam. The most noteworthy feature about the geographical location of the British Isles is perhaps their central position in the Land Hemisphere of the globe. Moreover, there is an extensive continental shelf around, and the coast-line is long and deeply indented so that even the remotest corner in the British Isles is not even 100 miles from the sea. We can divide the different political units into a number of well-defined physico-structural units. Scotland is divisible into three parts: (a) *The Highlands*, covering roughly the northern half of that country; (b) *The Midland Valley*, bordering the Highlands on the south; and (c) *The Southern Uplands*, west of the Midland Valley. The Highlands are mainly of old crystalline rocks, and in some places of interpenetrating granite formation, yielding building stone. There

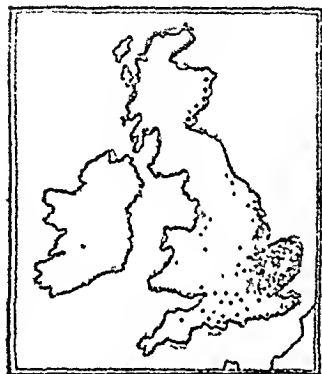
are stone quarries at Peterhead and Aberdeen. The soil is poor and the region covered with moorland, except for the small eastern valleys and coastal areas. The Southern Uplands, on the contrary, consist of a broad but low fold range, furnishing a poor soil, that is suitable for sheep. The Midland Valley is actually a rift valley formed by a sedimentary block, bordered on both sides by rocks of ancient sandstone, and containing three extensive coal basins—the Ayrshire Basin in the west, the Midlothian and Fifeshire Basin in the east, and the Lanarkshire or Clyde Basin in the middle. Running down the middle of north England is (a) a mountain backbone called the *Pennines*, north-west of which is (b) *Cumbria* or *The Lake District*, formed by ancient rocks in the centre and overlaid on all sides by younger rocks. Then there is the great (c) *Midland Plain* covering the greater part of the country, and (d) *The South-Western Peninsula* of Devon and Cornwall, consisting of masses of granite intruded into ancient rocks, a region fairly rich in various metalliferous minerals. The whole of Wales is mountainous; in the north are the (a) *Cambrian Mountains*, formed by ancient crystalline rocks. But (b) *South Wales* consists largely of younger folded rocks, with the South Wales coal-field. The greater central part of Ireland is a hollow plain, nearly encircled by mountains. For its latitude the British Isles have pleasant and equable climate. This is attributed to the warm and moist Westerlies (S. W. Anti-Trades) and the warm North Atlantic Drift. But the weather is capricious, because the Westerlies are not steady like the Trade Winds or Monsoons. Rainfall is fairly distributed all over the country, but owing to the mountainous nature of the west it is heaviest in that section; and although there is rain all the year round, the maximum precipitation occurs in autumn. The natural vegetation of the British Isles is deciduous forest, and the shedding period of the Vegetation

broad-leaved trees is in winter. Some conifers are found in the north and on the hills. But as in China, although largely for a different reason (for Britain is essentially an industrial country), the natural vegetation of the country has been nearly wiped out.

Fishing is an important industry of Great Britain. The fishing grounds are the North Sea, the Irish Sea, St. Georges Channel, the Bristol Channel and the shallow waters off the northern, western and southern coasts of Ireland. But the fishing regions visited by British ships are by no means confined to these areas only and the British fishery-area now extends over more than a million sq. miles, from the coastal waters off Morocco in the south to the Arctic Ocean in the north. The most important fish ports are London, Grimsby, Hull, Lowestoft, Yarmouth, Fleetwood, Milford and Aberdeen. The North Sea is the greatest of the British fishing grounds, wherein the *Doggers Bank* abounds in fish. The depth of water there is not more than 25 fathoms. *Herring* and *Cod* form about 60 per cent., of the total catch. *Pilchards*, *Mackerel*, *Halibut*, *Haddock*, etc., are also caught. About 700,000 tons of fish are landed annually at British ports. In spite of heavy home consumption a surplus of 200,000 tons is available for export.

The relative importance of agriculture in Great Britain is best understood by comparing the total value of agricultural produce with that of other items of primary production as well as of manufactures. As the statistics for 1935-37 (post-Depression years) show, the total value of agricultural produce sold (exclusive of consumption in farmers' households) was a little less than 1/15th that of manufactures; while the total value of the mineral output was nearly 1/19th, and that accruing from the fisheries was

less than 1/216th that of manufactures. The distribution of the two principal food crops in the British Isles may be noted in the accompanying diagrams. To understand this distribution thoroughly we must remember that moorland occupies large tracts of Great Britain in the mountainous north and west, and even in the Midlands more than half the total area is under permanent grass for the



THE WHEATLANDS OF
BRITISH ISLES.



THE OAT-LANDS OF
BRITISH ISLES.

sheep. Moreover, Scotland is too cold and Ireland too damp for *wheat*, which is the chief food crop. The largest concentration of wheat is, therefore, in the drier south-east. *Oats* are also grown mainly in the drier east, but their range is greater as they can ripen in a colder climate. Intensive agriculture is practised, and mixed farming and crop rotation are the general rule. Other important crops are *barley*, various *root crops*, *sugar beet*, *peas*, *beans*, *fodder crops*, *hay* and *fruits*. The distribution of barley is similar to that of wheat; sugar beet is distributed mainly in the east of England, and some *flax* is also grown in Ireland. Only 8 per cent of the population in Great

Britain are farmers. Britain is one of the leading *wool-producing* countries, and her wool has always been noted for its quality. There are over 20 million sheep of various breeds in the country. The number of cattle is half that of sheep, but they are more important than the latter in Ireland because of the damper climate there. The number of pigs in Britain is above $3\frac{1}{2}$ million, and about $1\frac{1}{2}$ million in Ireland. Owing to transport facilities draught animals are, however, becoming rare; the number of horses on the farms, for example, is now about 1 million only.

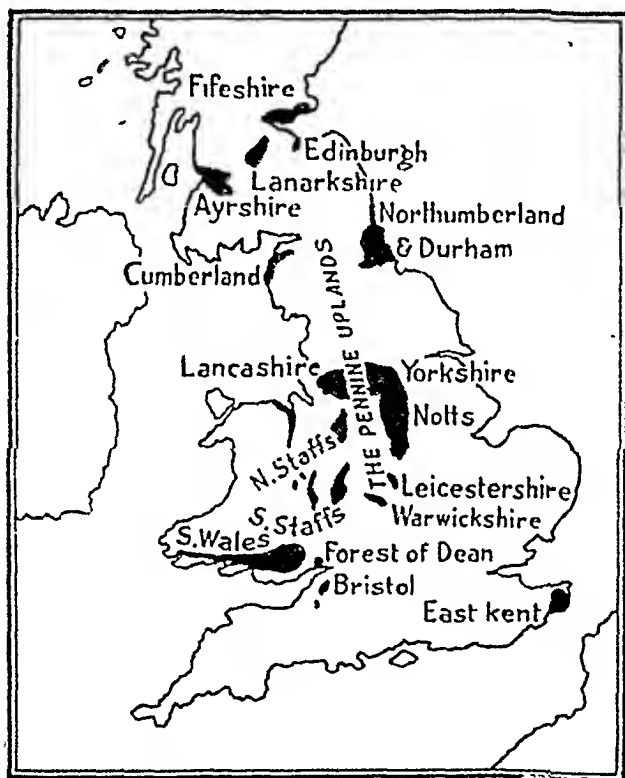
The mineral position of Great Britain is peculiar: about 90 per cent of the total output of minerals consists of *coal* only. "Thus coal has an overwhelming dominance among the British minerals from the point of view of value of annual production, but even this does not measure its real importance to the country. It provides indispensable domestic fuel in a densely populated country that is virtually without timber; it provides the power for practically all the industries; and it provides the only bulky commodity for export from a country which in the main has exports that are far less bulky than the raw materials and food-stuffs that are imported. By enabling ships that would otherwise leave empty to carry a cargo it has helped to reduce freights on inward cargoes, and so has enabled the general population to get food-stuffs and the manufacturers to get their raw materials at the lowest possible cost."¹

The coal-fields of the British Isles are found mainly in Scotland, England and Wales. In annual production the British Isles stand second only to the United States. The coal is also of good quality ranging from bituminous to

¹R. O. Buchanan—*An Economic Geography of the British Empire*.

anthracite in character. In Scotland the coal-fields lie mainly in the central lowlands. There are four important fields.

(1) The *Ayrshire Field* adjoins the Ayrshire coast, (2) The



THE COALFIELDS OF GREAT BRITAIN

Lanarkshire Field stretching from the Clyde above and Glasgow, across the Forth, in the neighbourhood of

(3) The *Fife Field* in the north-east. (4) The *Midlothian Field* which is only the co.

Fifeshire Field across the Firth of Forth, lies east and south-east of Edinburgh. The Lanarkshire coal-field being situated in the industrial area of Scotland, the whole of its output is consumed locally. The five important coal-fields of England are on either side of the Pennines. They are (1) Cumberland coal-fields, (2) Lancashire coal-fields, (3) Midland coal-fields which include the coal-fields of North Staffords and South Staffords.. (4) North-East coal-fields which consist of the Northumberland and Durham coal-fields. (5) Yorkshire coal-fields Besides these there are three small coal-fields in Leicestershire, Nottinghamshire and East Kent. Near about the *Cumberland coal-fields* there is no important industrial region excepting at Barrow, where there is some amount of iron smelting. *Lancashire coal-field* has helped the cotton industry of England to attain the position it has gained now. The important centres of cotton industry, lie near this coal-field *Yorkshire coal-field* opposite to the Lancashire coal-field on the other side of the Pennines is an important seat of woollen industry. The climate is dry, therefore it helps the manufacture of woollen articles. In the South of the coal-field is Sheffield which is noted for its cutlery. *Midland coal-fields* consist of the small coal-fields in the *North and South Staffordshire*. The surrounding towns of Stoke, Burslem etc., are pottery towns. In Birmingham varieties of small iron articles are produced. The North-East coal-fields which include the coal-fields of *Northumberland* and *Durham*, are great iron-smelting regions. The iron ore is supplied from the Cleveland fields of Yorkshire and from foreign countries also. Newcastle is a great ship-building yard. The chief seat of iron smelting is at Middlesborough. There is leather industry near the *Leicestershire coal-fields*. In Wales there are two fields—(1) The *North Wales Field* which produces only steam-coal. It is a small field (2) The *South Wales*

Field produces very good quality anthracite. Tin plating Welsh and the smelting of iron, tin and copper are the important coal-fields industries in the neighbourhood.

Iron is Britain's most important mineral commodity after coal; much of Britain's industrial prosperity has been traced to the association of iron ores and coal. But of the *Iron ore* total mineral output of Britain at the present time, iron-ores constitute only about 1·5 per cent., and iron ores are no longer—or very little, if at all—worked in the coal-field region. The bulk of it is obtained from the *Cleveland Field* in Yorkshire and from the Midlands—*Lincoln, Rutland and Northampton*. These ores are of poor quality and the total output is quite inadequate for her own requirements. So, large quantities of good quality ore have to be imported from Spain and Sweden. Other metals include Tin and Copper in Cornwall and Lead in Wales and Derbyshire, besides *building stones, road materials and China clay*. But *Other minerals* the production of metals has diminished considerably. *Salt* worked chiefly in Cheshire, supports chemical industries

The distribution of Britain's Manufacturing Industries has naturally been governed by a desire for location in the coal-field regions for obvious reasons. But a special feature of British manufacturing industries is localisation *Manu-* and specialisation. The *Textile Industries* form a very *factures* important group among the manufacturing industries of the British Isles. They support probably over 4 millions of people. The most important of these is the Cotton Industry which is located in—or almost restricted to—the Lancashire coal-field region in England and Glasgow region in Scotland. This localisation, especially in Lancashire, has been attributed to three causes besides the proximity of the S. Lancashire coal-field region—(a) the manufacture of woollens from the wool of the Pennine sheep was an early

industry in England, and thus here have been born generations of spinners and weavers; (b) secondly the damp climate and the soft water from the Pennine streams are eminently suited to cotton manufacturing; (c) thirdly the



THE INDUSTRIAL REGIONS OF GREAT BRITAIN.

Lancashire region possesses enormous facilities for importing cotton from America and for exporting the finished goods through *Liverpool* and *Manchester*, the two most

important West Coast ports of England. Even spinning and weaving are largely localised. "Not only do towns specialise as between spinning and weaving, but spinning towns specialise on particular types of yarn and weaving towns on particular kinds of cloth." The chief spinning towns are Bolton, Bury, Rochdale, Oldham, Wigan and Stockport; while the weaving towns are Preston, Blackburn, Accrington and Burnley. (Manchester is no longer an important cotton-manufacturing town but it is the commercial and financial centre of the industry.) Liverpool is the great port of this region, but supplies of raw cotton are now directly available in Manchester by the completion in 1896 of the Manchester ship canal. The Lancashire coal-field in Scotland, also has a cotton industry around Glasgow and Paisley. It is of less importance compared with Lancashire. Its advantages of soft water, climate and coal are similar to those of Lancashire. Glasgow is nearer than Liverpool to the cotton-producing tracts of the U. S. A. This area is particularly noted for sewing thread.

The Woollen Industry ranks second in importance among the textile industries of the U. K. It is much more widespread than the Cotton Industry. The West Riding of Yorkshire is the most important woollen manufacturing centre of the British Isles. The *geographical advantages* are the abundant supply of soft water for bleaching and dyeing purposes, presence of coal, the existence of an ample supply of labour and supply of wool from the neighbouring regions. Now, most of the wool has to be brought from elsewhere. The wool comes chiefly from Australia and New Zealand, South Africa and Argentina. Bradford is the principal centre of the industry, both industrially and commercially. Leeds is more

Woollen
Industry.

Lancashire—the two great salt-fields of the country—are the most important chemical manufacturing regions. The West Riding of Yorkshire, the London Area and the Scottish Lowlands are also noted for chemicals. Dyes, mineral acids, alkalies, soaps, margarine, medicines and drugs, candles, etc., are the chief products.

Tanning and manufacture of Leather goods are also important industries. These industries are not much dependent on coal. The localisation of these industries is mainly determined by the supply of raw materials. At Nottingham and Leicester it grew up on local hides and skins, soft water and tanning materials from the neighbouring oak forests. Now-a-days the raw material is imported, so the industries are localised in or near about the great ports, which are best suited for the import of hides from the U. S. A., France, Germany and India. London is the most important area.

Other industries include *Glass manufacturing* (Leeds, Glasgow, Birmingham and London), *Potteries* (Stoke, Burslem, Hanley, Longton and Tunstall), *Rubber manufacturing* (Birmingham), *Flour-milling* (London, Hull, Liverpool, Glasgow, Cardiff), *Sugar-refining*, *Chocolate manufacturing* etc., etc.

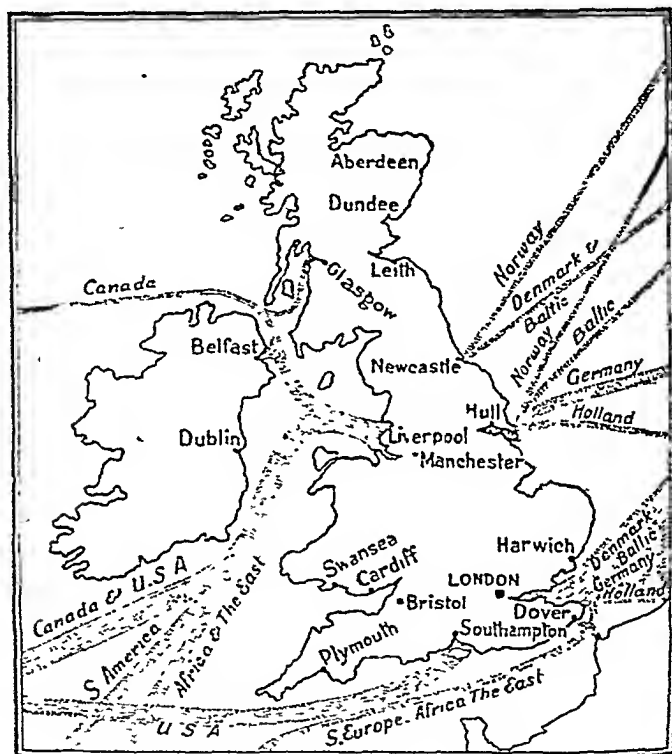
Internal trade is carried on by road, railway, and canal and by coasting-vessels. The country is covered by a net-work of railways and canals. Roads are also important and there are now regular motor services between nearly all the important cities of Great Britain. Natural communications by water comprise the sea and the rivers. The rivers of Great Britain are not very advantageous for inland shipping, as they are neither very long nor very wide. Moreover, they are often winding in their courses

and have shallows or rapids. But the lower courses of the larger rivers are often navigable from their mouths by the largest ocean-going liners and constant dredging operations enable them to penetrate far inland. Such, for instance, are the Thames, Humber, Tyne, Firth, Tay, Clyde, Mersey and the Severn. Many towns on their banks, even a considerable distance inland, are accessible to coastal shipping. Canals are not very important except over the Midlands. Judged by continental standards, all English canals are small. The typical barge is of only 24 tons as compared with 300 tons in Germany. The ship-canal of the country are the most important and serve the Industrial regions of the country. *The Manchester Ship Canal* enables ships to travel up the Mersey as far as Manchester. The canal is about 35 miles long. Manchester has been converted into a sea-port by the opening up of this canal. Great Britain is very well served by Railways and has 20,400 miles of railway although it is 1/20th the size of India. The Railways are grouped into four systems—(a) *The London Midland—Scottish System* (7,464 miles). Serves the Central and North-Western England and most of Scotland. It passes through the great industrial regions of the West Ridings (Yorkshire), the Midlands, Cheshire and Lancashire and the Scottish lowlands. (b) *The London North Eastern Railway* (6,464 miles), serves the east coast fishing ports, the eastern agricultural districts and the New Castle industrial region. (c) *The Great Western System* (3,675 miles), serves the industrial towns of the "Black Country", Wales and South Western England. (d) *The Southern Railway* (2,129 miles), serves the area to the South of London. It serves no industrial area and is dependent mainly on passenger traffic. London is the "focus" of all these railway systems. Almost all the important cities and ports have direct railway connection with London.

Water-ways.

Railways

The principal ports of the British Isles have been dealt with in some length elsewhere.



BRITISH PORTS AND TRADE ROUTES

Great Britain's prosperity depends mainly on her foreign trade. Her excellent situation in the centre of the land hemisphere, facing the continent of Europe, the existence of commodious estuarine ports and the highly industrialised economy of the country greatly encourage foreign trade. The following tables show the important exports and imports of Great Britain.

The Exports of the United Kingdom¹

Commodities	Percentage of Total Value.		
	1924	1926-30	1931-35
<i>Raw materials</i> .. .		13·6	13·4
Coke & coal	2·8	6·4	8·7
<i>Foodstuffs</i>	—	5·9	5·4
Fish	1·1	1·1	1·1
Spirits	1·5	1·3	1·6
<i>Manufactures</i>	—	71·3	57·2
Cotton goods .. .	24·9	19·2	15·3
Yarn	3·5	3·0	2·7
Thread	0·9	0·9	1·1
Iron & Steel	9·3	8·3	6·9
Machinery	5·6	7·4	8·9
Automobiles	—	2·4	3·3
Ships	0·7	1·8	1·1
Electricals	1·3	1·8	1·9
Railway vehicles ..	—	1·4	0·6
Woollens	8·5	7·2	6·9
Tissues	5·2	4·6	3·8
Yarn	2·0	1·5	1·6
Tops	0·8	0·7	0·8
Silk (& artificial) ..	0·3	1·4	1·3
Linen Yarn & mf ..	1·7	1·4	1·5
Apparel	3·8	3·7	3·0
Paper &c.	—	1·4	1·6
Rubber goods	—	1·3	1·4
Glass & earthen ware ..	1·6	1·9	2·0
Leather goods .. .	1·5	1·1	0·9
Chemicals	3·2	3·5	4·7

¹ Chisholm.

The Imports of the United Kingdom¹

Commodities	Percentage of Total Value		
	1924	1926-30	1931-35
<i>Raw materials</i>	23.3	25.4	24.6
Cotton	9.5	6.0	4.6
Wool	5.5	4.7	4.9
Wood & wood pulp	4.0	4.8	5.5
Petroleum	—	3.6	4.2
Rubber	0.8	1.7	0.9
Hides, skins & furs	1.7	2.2	2.1
Zinc, lead, tin, copper, iron ores	1.8	2.4	1.8
Oil-seeds & nuts	4.1	1.4	1.5
<i>Foodstuffs</i>	37.9	31.7	37.0
Meat (for dried)	15.8	17.9	22.2
Animals	1.7	1.1	1.2
Grain & flour	9.5	8.3	8.7
Wheat	5.4	5.0	4.1
Maize	1.3	1.1	1.5
Wheat meal & flour	0.7	0.6	0.5
Butter	4.3	4.2	5.2
Tea	3.2	3.1	3.6
Sugar	3.5	4.0	2.0
Fresh Fruit	2.5	2.9	4.0
Eggs	1.5	1.4	1.2
Cheese	1.1	1.2	1.1
Tobacco	1.2	1.4	1.7
<i>Manufactures</i>	8.7	10.6	14.4
Silk yarns & mf.	2.0	1.2	0.6
Wool yarns & mf. (with apparel)	1.2	2.5	1.9
Cotton yarns & mf.	0.7	0.8	0.5
Iron & steel mf.	1.7	2.3	1.5
Machinery	0.8	1.4	1.6
Leather mf.	1.1	1.2	1.1
Chemicals	1.2	1.3	1.0
Paper &c.	—	1.5	1.8

¹ Chisholm.

Direction of Foreign Trade of U. K.¹ EXPORTS

Countries.	Percentage of Total Value		
	1924	1926-30	1931-35
Br. India	11.3	11.2	8.8
Australia	7.8	7.2	5.6
U. S. A.	6.6	6.3	5.0
Eire	5.3	5.5	6.2
Germany	5.4	5.1	4.3
Canada	3.5	4.6	4.8
South Africa .. .	3.8	4.2	6.2
Argentina	3.4	4.0	3.4
France	5.2	3.9	5.0
Netherlands .. .	3.1	3.1	3.2
Belgium	2.8	2.9	2.5
New Zealand .. .	2.6	2.7	2.8
Italy	2.2	2.0	2.3
Empire	11.7	15.6	15.7
Foreign countries .	58.3	54.1	51.3

Direction of Foreign Trade of U. K. IMPORTS

Countries.	Percentage of Total Value		
	1924	1926-30	1931-35
U. S. A.	18.5	16.3	11.6
Argentina	6.2	6.1	6.4
Germany	2.9	5.6	4.9
India	6.2	5.1	5.0
France	5.3	4.9	3.3
Denmark	3.8	4.6	5.2
Australia	4.6	4.4	6.6
Canada	5.2	4.4	6.2
Eire	4.0	3.8	3.2
Netherlands .. .	3.3	3.8	3.3
New Zealand .. .	3.8	3.9	5.1
Belgium	2.8	3.0	2.5
U. S. S. R.	1.5	2.2	2.8
Sweden	1.6	2.0	2.3
Egypt	3.0	1.9	1.6
Empire	30.2	27.1	33.5
Foreign countries ..	69.8	72.9	66.5

¹ Chisholm.

Superficially viewed, the foreign trade of the United Kingdom shows an adverse balance; for there is a large excess in the total value of imports over that of exports.¹ But the United Kingdom derives great benefits from investments elsewhere, and the value derived from this source is about one-half of the total obtained from the exports. Moreover, receipts from shipping constitute about one-third of the total value of the export trade. And last but not least, the United Kingdom carries on considerable *entrepôt* trade, and the receipts accruing therefrom are also quite considerable.

Exports of Imported Commodities from U. K.

Commodities				Percentages of Total Value		
				1924	1926-30	1931-35
<i>Raw materials</i>						
Wool	..	..		22.4	22.3	22.3
Rubber	..	..		7.2	13.2	3.7
Hides	..	..		1.4	1.2	0.7
Skins & furs	..	..		8.0	8.6	12.4
Cotton	..	..		8.3	4.9	3.3
Jute	..	..		0.3	0.3	0.4
Petroleum	..	..		—	1.3	1.9
Tin	..	..		1.8	1.7	1.2
<i>Foodstuff</i>				5.0	6.8	8.7
Tea	..	..		—	3.1	2.3
Meat	..	..		—	1.4	1.2
Fish	..	..		—	0.9	0.4
Spices	..	..		—	0.7	1.3
Tobacco	..	..		1.2	1.8	2.7
Coffee	..	..		—	1.2	1.9
Butter	..	..		—	1.2	2.1
Fruits	..	..		0.7	0.6	0.9
Maize	..	..		0.5	0.5	0.7
Wine	..	..		

¹ The total value of imports in 1924 was £1279.8 million, in 1926-30 £1184.5 million, and in 1931-35 £745.5 million. Corresponding figures for the export trade were £795.4 million, £338.6 million and £389.5 million. But corresponding figures for the re-export trade of imported commodities were £140, £113, and £54 millions.

Exports of Imported Commodities from U. K.—*Con.*

Commodities	Percentage of Total Value		
	1924	1926-30	1931-35
<i>Manufactures</i>			
Leather .. .	1.3	1.7	2.0
Silk .. .	2.5	1.4	0.8
Carpets & rugs .. .	—	1.3	1.0
Cotton .. .	1.8	0.7	0.3
Machinery .. .	—	1.4	1.2
Artificial silk .. .	—	0.6	0.9
Drugs .. .	—	1.4	1.7

NORTHERN IRELAND has an area of only 5,237 sq. miles, and a population of about 1.28 million. The inhabitants are mainly of English and Scotch descent. The chief agricultural products are *oats* and *flax*. The capital is Belfast, where there are textile mills (for spinning flax and weaving linen and cotton), distilleries, and ship-building yards. Another seat of textile industries is Londonderry.

THE CHANNEL ISLANDS together comprise a total area of 75 sq. miles only. The principal products are *potatoes*, *tomatoes*, and *grapes*.

EIRE or the Irish Free State is a self-governing democracy enjoying the official status of a British Dominion. The total area is 26,592 miles, and the population 2.97 million. The principal crops in the order of their importance are *oats*, *potatoes*, and various other *root crops*, as well as some *barley* and *wheat*. Large numbers of domestic animals are kept; and the country, with its hurried weather conditions and extensive ill-drained areas, is said to be more suitable for stock-raising than agriculture. The principal manufacturing industry is concerned with the preparation

of liquors There is a large water-power station at Limerick for harnessing the flowing waters of the Shannon, the largest in the British Isles, which provides electricity for the entire country, and to a large extent compensates for the want of coal. Under the present regime the country is endeavouring hard for economic self-sufficiency. About 90 per cent of the total trade was with the United Kingdom; but a drop has been in evidence for some years.

SCANDINAVIA

Scandinavia is a mountainous peninsula on the north-west of Europe, and resembles the island of Great Britain in topographical as well as structural features. The coast-line is long and deeply indented, especially on the west, and the inlets, often quite considerably long, are called 'fjords'. Often again these long narrow fjords are bordered by vertical cliffs rising directly out of the water. Near the west coast is a long ridge of mountains, consisting of very ancient hard rocks similar to those of the Scottish Highlands. The slope of the land is naturally to the south-east. The warm North Atlantic Drift flows close to the western shores, and the peninsula lies in the path of the Westerlies. Thus the western shores as far even as the North Cape within the Arctic Circle remain ice-free all the year round; and there is a fairly heavy rainfall throughout the year especially in the mountainous west. The larger rivers flow south-east because of the general slope of the peninsula; and the mountains of Scandinavia being much loftier than those of Scotland, run swiftly down great heights, enabling them to be harnessed for electricity. The peninsula is divided between the two countries of Norway and Sweden.

NORWAY lies west of the mountain divide, and is much more fjorded and mountainous than Sweden. It has

an area of about 125,000 sq. miles, and a population of 2,800,000. Owing to heavy precipitation the mountains are often covered with forests, which, together with the fisheries, Fishing.



A GENERAL MAP OF SCANDINAVIA

constitute the principal source of the national wealth. Fishing is the most important industry. The principal catches are *Cod* and *Herrings*. Fisheries are mainly in

in-shore waters and little part is taken in the North Sea fisheries. Trondjhem and Bergen are the leading fish ports. More than 50 per cent of the total area is waste land covered by mountains, 25 per cent by forests, and less than 10 per cent classed as arable, and only 4 per cent of the total area is actually under crops. The leading crops are *oats* and *barley*, and in general, other crops are much the same as in Great Britain. About $2\frac{1}{2}$ per cent of the forests are reserved by the Government. Norway is poor in mineral resources. There is no coal. But she has fairly large reserves of low-grade *iron* and a limited supply of high-grade iron ores at Kragerō and Arendale. Perhaps the most valuable sources of her mineral wealth are the *copper* mines at Roros in the Glommen River Valley and at Sulitjelma and other places. There are *silver* deposits at Konigsberg near Oslo. *Silica* and *apatite* are abundant near Stavanger. There is a refinery for *nickel* ores at Kristiansand. Some *sulphur* is also exported, and there is a fairly large export of granite and other stones. But poor as she is in mineral resources, Norway has almost unlimited water-power. Of the available total estimated at 9.5 millions of horse-power, only 2.2 millions have been developed. These have been largely developed by foreign capital, and many of the manufacturing industries of Norway are in the hands of foreigners. Large-scale industries are not much developed. Copper, silver and aluminium are worked by electric furnaces. Ship-building is growing in importance. There are also chemical and paper-making industries.

The towns of Norway have already been dealt with. The country lacks extensive railways, because of the mountainous nature of the surface. With the exception of the railway to Narvik, all the lines are in the south, connecting Oslo with Bergen and Trondjhem.

Spitsbergen and Bear Island in the Arctic circle are the only foreign possessions of Norway. Recently, however, *coal* has been discovered there.

SWEDEN, with a total area of 173,000 sq. miles, is larger than Norway, and supports more than double (6,200,000) the population of the latter. It is on the broader slope of the Scandinavian Peninsula, and comprises a considerable portion of the Great European Plain in the south. The northern half or two-thirds of the country is covered with *forests*, where lumbering is the dominant occupation of the people; but Southern Sweden is essentially an agricultural country. More than 12 per cent of the total area of Sweden is actually under crops. But the climate of the south is of the continental type, too cold for wheat, and so the leading crops are *oats* and *rye*. Much *hay* and *fodder* for the cattle are also grown in this region. On the shores of the Baltic there are many saw-mill towns, to which timber from the northern forests are floated down the numerous mountain streams. Sweden is fairly rich in mineral resources: there are deposits of very high grade *iron* ore in Damemora and Gellivara, whence large quantities are exported to Germany, Britain, Belgium and other countries. The existence of iron ore of good quality has given rise to an important iron and steel industry with the aid of cheap hydro-electricity. The chief centres are at Stockholm and Norkoping. Dairy farming is important in the south; and so are the manufactures of paper, electrical machinery and matches. There are textile mills at Norkoping. The capital, Stockholm, is also a great port. From Sweden the chief exports are iron ore, wood pulp and paper, timber, metal goods, etc., and the imports consist mainly of wheat and flour, textiles, coal, petroleum and machinery.

Extent and
character-
istics

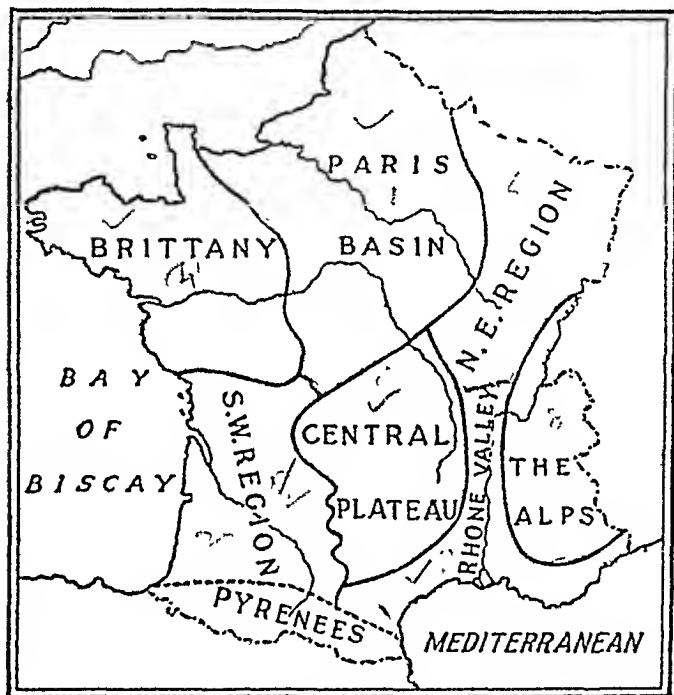
Agriculture.

Minerals
and
Industries.

THE GREAT EUROPEAN PLAIN

FRANCE comprises an area of 213,000 sq. miles, with a population (in 1931) of 41,800,000. Her geographical position, in many respects, unique in Europe: she has a long coast-line along the English Channel facing Great Britain; another long coast-line along the Bay of Biscay faces the New World across the Atlantic; and she shares a considerable portion of the coast-line along the Mediterranean Sea. France thus possesses certain unique advantages for maritime development; and she, too, is, like Great Britain, the mistress of a fairly vast overseas dominion, which—and that is the most characteristic point about it—is comparable in variety and extent with the still vaster empire created by Great Britain. In some respects, however, France enjoys far greater advantages of situation than does Great Britain: she is continuous with the rest of Europe, and has benefited (and also been handicapped) more by the heritage of ancient Roman civilisation. Space does not permit any analysis of such facts here. But it is obvious that these have never proved to be quite unmixed blessings; for her contiguity with all the strong and warring nations of Europe has always involved her in the whirlwind of European politics, while Britain's comparative isolation has left her hands free for overseas expansion. From a strictly geographical point of view, however, the disadvantages of her land frontier far outweigh its advantages: the lofty and difficult Pyrenees stand in the way of communication between France and Spain; the great Alps form the boundary between France and Italy, rendering communication between the two countries difficult; so it is between France and Switzerland; and even between France and Germany on the one hand, and between France and Belgium on the other, the frontiers are

ill-defined, and have been the occasion of many a bitter struggle. The physical regions of France are shown in the accompanying map. *The Central plateau* is a well-marked Physical Features unit. This region is rich in mineral wealth. The important coal-fields of this area, are situated round St. Etienne. Iron-



THE PHYSICAL REGIONS OF FRANCE

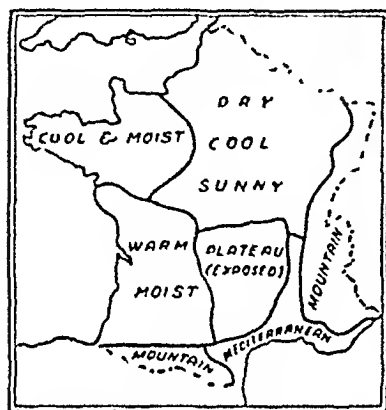
ore is found in this region but the present output is inconsiderable. The massif is mainly composed of Archaen rocks. Therefore the soil is not very fertile. The chief crop produced is rye. Wheat and oats are grown in such favoured localities as the valley of the Allier. Pastoral

farming is also extensively carried on in this region. The *Armorican Massif* or Brittany in the north-west consists mainly of primary rocks. The uplands separate three low land districts. The uplands are absolutely unproductive. The *S. W. Region* is a lowland, surrounded by the Central Plateau, the *Armorican Massif* and the Pyrenees. The character of the soil is very variable. Agriculture is the chief occupation here. Wheat, maize and vine constitute the chief products. The *S. E. regions* are in the Mediterranean area. Between the Alps and the Central Plateau is the fertile *Rhone Valley*. The vegetable products are distinctly of the Mediterranean type including olives, vine and mulberries. Wheat is the important cereal grown. The *Alpine Zone* plays but a relatively small part in the economic life of France. The soil is usually poor and unproductive. Anthracite coal and iron occur in places. The *Paris Basin* lies between the Central Massif, Ardennes and the *Armorican* region. This is the greatest agricultural region of France. Wheat, oats, sugar-beet, and vine are the most important products. It is also the most industrially developed region of France. The *Plateau of Lorraine* is noted for its mineral wealth. This region has important deposits of iron and coal and important metallurgical industries have developed on the ore-fields.

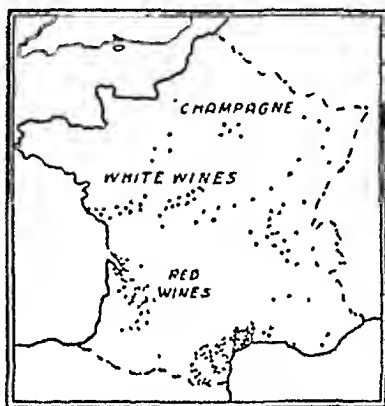
Generally speaking, France enjoys a marine type of climate. On the whole it is temperate in the North and sub-tropical in the South. The physical character of the different parts of France and their relative position to one another and to the Atlantic and the Mediterranean, give to the country a somewhat varied climate, each region having its own peculiarities¹. It is quite evident from the accompanying map. The greater part of the country except the

¹ Macfarlane, *Economic Geography*, p 101

Mediterranean region enjoys rainfall throughout the year with a summer maximum. The higher parts have the greatest precipitation and it decreases progressively from west to east.



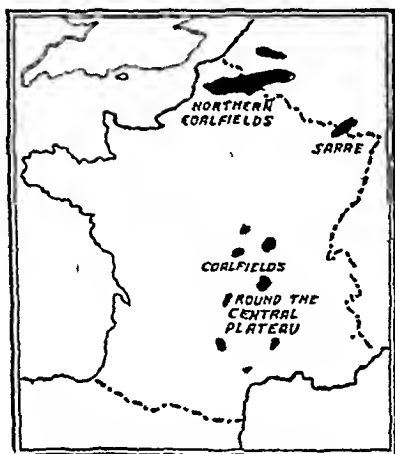
THE CLIMATIC REGIONS OF FRANCE



THE VINEYARDS OF FRANCE

The natural vegetation of France is forest, which covers about 20 per cent of the total area; and forestry is quite important in the country. Moorland covers some 10 per cent of the surface. And as much as two-thirds of the whole area is under tillage. France is primarily an agricultural country although she has a fairly important world position as a manufacturing country. The principal crops are *wheat*, *oats*, *maize*, and a great variety of *fruits*. Wheat is naturally concentrated in the Paris Basin, where the climate is 'dry, cool and sunny'; and if Russia is excluded, France alone produces a quarter of the wheat of Europe, although she has got to import a small amount of wheat now. Oats are grown chiefly in the 'warm moist' south-west. The diversity of France's climate is easily reflected in the great variety of the fruits grown: apples and cherries flourish

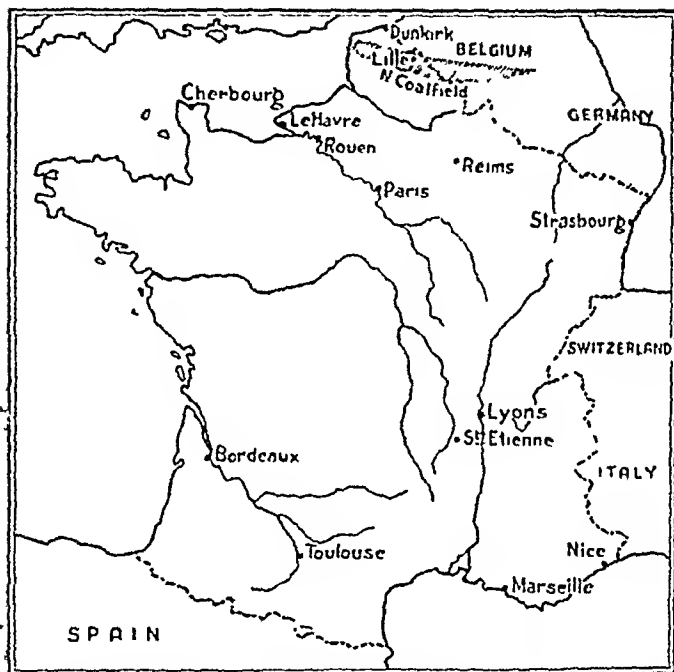
in the Paris Basin; the olive in the Mediterranean region; and grapes—most important of all—in the south. France is the largest producer of wine in the world. Though not noted for animal products like Argentina, Uruguay, etc., the climate and soil of France are suitable for dairy cattle rather than for sheep. The number of cattle, horses and pigs is said to be double that of Britain, but that of sheep is half. French fisheries in both the Atlantic and the Mediterranean are also of some importance. France is, however, not rich in minerals—generally speaking. But the *coalfield* of Northern France is very important, and geologists are of opinion that this field is connected under the Straits of Dover with the coalfield of East Kent in England on the one hand, and with the coalfield of Belgium



THE COALFIELDS OF FRANCE

on the other. There are very small coalfields in the Central Plateau Region. The Saar coalfield is on the German border. Home supply of coal being insufficient for her

requirements, large quantities have to be imported from abroad, particularly from Britain and America. But France is rich in *iron* ore, though the bulk of the local supply is of poor quality, and France buys coke from Germany or Belgium chiefly for the smelting of her iron ores. The largest iron-field is in Lorraine. There are other deposits



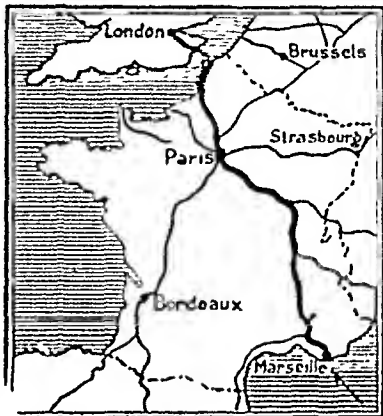
THE INDUSTRIAL REGIONS OF FRANCE

near Le Creusot and in Normandy, near Caen, as well as in various other places such as the eastern Pyrenees and Canigou. Other minerals include a small amount of *petroleum* and large quantities of *potash salt*, both obtained

mainly from the Alsace region. France's poverty in coal and her wealth of potential water-power have impelled her to develop *hydro-electricity*, called playfully 'white coal'. She has abundant reserves of water-power in several areas, particularly in the regions of the Alps, the Pyrenees and the Cevennes. Even main-line railway trains are now being driven by electricity in many places, particularly in the south; and there is a plan to use electricity throughout the French railway systems. The localisation of French manufacturing industries has been governed more by the facilities for obtaining raw materials, both from local and foreign sources, and the conveniences for marketing the products than by the supply of fuel.

The principal industrial region of the country, however, is in the coalfield region of Northern France; and the southern coalfields also have given rise to a few industrial towns there. The industries of Paris, the capital of the country, are, however, of a miscellaneous nature; but in general it may be said that the production of articles of luxury is its distinctive feature. The principal region of various *textile manufactures* is in the north; Lille is the largest manufacturing town of this region; other manufacturing towns are Roubaix and Tourcoing, all carrying on cotton, linen and woollen industries. Cambrai, to the south-east of Lille, is famous for fine linens. Besides these towns, woollen industry is centred at Rheims, Amiens, Fourmies, Sedan, Louviers, Elbeuf, Troyes, etc. The supply of wool is obtained from native pastures lying around as well as from abroad, the latter particularly from Australia and the River Plate region of South America. Roubaix, Croix, and Tourcoing are noted for carpets as well, and Troyes is the chief seat of hosiery. *Silk industry* is centred in the Rhone Valley. Lyons is

the main centre; other centres are St. Etienne, Avignon and Nîmes. Mulhouse, St. Dié, Epinal, Sénonès, Guebwiller, Rouen, Roanne, St. Quentin, Colmar are, more or less, important centres for the cotton industry, besides those spoken of above. Other industrial towns are Angoulême and Annonay noted for the manufacture of paper, Limoges for porcelain and earthenware, Besançon for watches, Grenoble for kid gloves, and Strasbourg for various manufactures.

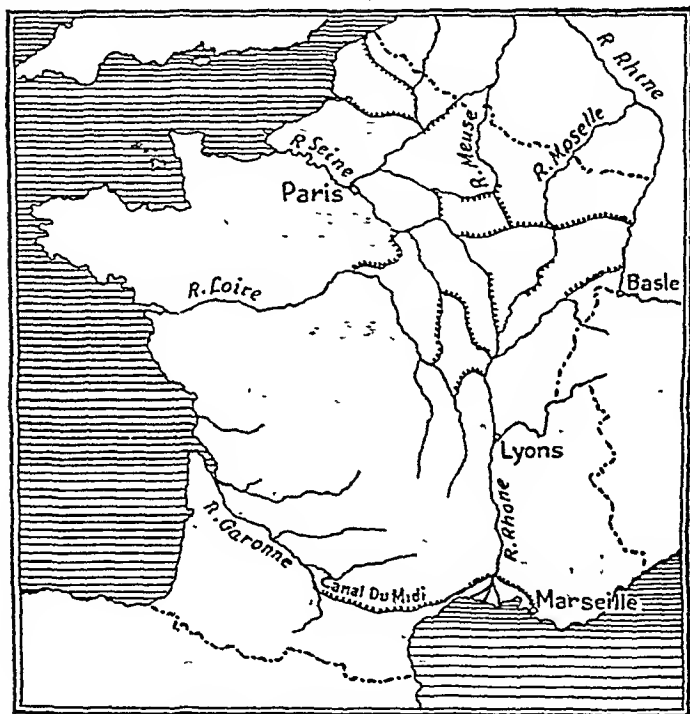


THE MAJOR RAILWAYS OF FRANCE

The manufacture of glass is centred in the coalfields of the north and the centre. The chief seats of the iron and steel industry are Lille, St. Etienne, Paris, Le Creusot and Caen. The seaports of France have already been described. France is very well served by roads and railways. Her road and railway systems centre on Paris. But perhaps the most characteristic feature of the inland communication of France is furnished by the splendid network of waterways. We have already seen that all the larger rivers of France—the Seine, Loire, Rhone—as well as their chief tributaries are generally navigable for long distances; these are now connected by a most complicated system of canals, and it is now possible to travel from the Mediterranean Sea to the English Channel entirely by water. The principal canals are: (a) *The Marne and Rhine Canal*, which connects the

Communi-
cations.

navigation of the Rhine with that of the Seine, and both of these with the Saar navigation by means of a northerly branch; (b) *The Burgundy Canal*, connecting the navigation of the Seine and Rhone through the Yonne and Saône;



THE INLAND WATERWAYS OF FRANCE

(c) *The Canal du Centre*, connecting the Saône with the Loire; (d) *The Rhone and Rhine Canal*, connecting those two rivers through the Saône; (e) *The Canal du Midi*, connecting the Garonne with the Mediterranean Sea and thus establishing direct communication between the Mediterranean and the Bay of Biscay; and (f) *The*

Marseilles-Rhone Canal, which passes through a tunnel nearly 5 miles long.

Commerce Manufactured goods take the leading place in the export list, particularly silk manufactures, which normally stand first, followed by chemical products, cotton textiles, metal goods, articles of clothing, pig iron and steel, motor cars, woollen goods, wine and medicines and drugs. The imports are mainly of coal, petroleum, raw cotton, cereals, oilseeds and rubber. France has a considerable amount of mercantile marine. France stood seventh on the list as regards world shipping in 1937. The French also have large amounts of capital invested abroad.

BELGIUM is quite a small country, less than 12,000 sq. miles in area; but it supports a population of nearly 8 millions. Though so small, it is easily divisible into three distinct parts. (a) *The Ardennes Region* in the south is formed by a plateau, covered partly with sheep pastures and partly with forests yielding valuable pine. An extension of the Luxemburg ironfields penetrates into this region from the south; and Belgium's output of iron is nearly a quarter of that of the United Kingdom. (b) *The coal-field Region*, bordering the Ardennes on the north, runs right across the country from west to east. It is a continuation of the great coalfield that stretches from East Kent through Northern France to the eastern borders of Belgium. Naturally, therefore, it is the great manufacturing region of Belgium, supporting, as it does, the bulk of the population. Belgium's output of coal is about $\frac{1}{8}$ th of that of the British Isles. Here are situated her chief industrial towns Mons, Charleroi, Namur, and Liege. These are all coal towns; but Charleroi is concerned with glass and chemical industries as well, and there are railway works at Liège. Much of the iron required for her industries is brought

Imports
and
Exports.

Natural
Regions
and
Resources.

from Luxemburg, and zinc ores are found in the east. (c) *Northern Belgium*, however, is, in the main, an agricultural country, and belongs more particularly to the Great European Plain. The chief crops, more or less in the order of their importance, are *rye, oats, wheat, potatoes, sugar-beet*, and *flax*. The land is not very fertile, and in the east especially it is of little use. A fairly large number of cattle are also kept in this region. Belgium has a second source of coal in the *Campine Coal-field*, lying in this region. Brussels, the capital and largest city, lies in the heart of this agricultural country; it is well served by railways, and has too many industries to be particularly associated with any, except perhaps the manufacture of lace. And here in this region lies the chief spinning and weaving towns of Belgium such as Ghent, Tournai, and Courtrai, all situated in or near the flax-growing region. Ghent is the principal seat of Belgium's cotton manufactures as well. The principal seat of her woollen industry, Verviers, however, is near the Ardennes. The ports of Belgium have already been dealt with. An industrial country like Belgium must naturally be well served by railways. The principal inland waterway is the River Meuse. The foreign trade of Belgium, however, shows an adverse balance. The principal exports of Belgium are mainly manufactured goods—machinery, metallurgical goods, cement, zinc, glass, textiles and chemical products. The imports consist of food-stuffs and raw materials.

HOLLAND is a little larger than Belgium, and has about the same number of people. The country is a flat level plain, and indeed a considerable portion of it lies below sea-level; hence the characteristic name of the Netherlands. The coasts are not fiorded, but the country has a long and varied coastline. Although

a level plain, it falls into two divisions: (a) *The Eastern Region* is contiguous with the plain of Northern Germany; the soil is poor and largely covered with forests. (b) *The Western Region* is largely formed by the Delta of the Rhine and the Meuse (Maas). This is the more characteristic region of Holland; for a large part of it is below sea-level and consists of reclaimed submerged land. Great dykes have been constructed to keep out the sea. There has been a big project in hand to reclaim the shallow *Zuider Zee*. Although a neighbour of Belgium, Holland is essentially an agricultural and pastoral country. There are large fertile alluviums here and there. The chief agricultural products are *oats, rye, wheat, barley, potatoes, and sugar-beet*. Large areas are under *grass*, and cattle farming is important. Large quantities of *butter* and *cheese* are exported and there is also a considerable export of *beet-sugar*. *Fishing* is also important, especially in the islands of the north. An extension of the *Campine Coalfield* lies in the south-east of Holland, and the present output of coal is said to be nearly half that of Belgium. Holland has always been famous for her wind-mills; for the country lies in the path of *Westerlies*. And despite the introduction of electric power, many of her factories and flour mills are worked by wind-power. The Hague is the capital of the country as well as the seat of the International Court. But Amsterdam, the centre of the diamond trade of the world, and Rotterdam, the largest port of Holland, are larger towns. Rotterdam has distilling factories. Utrecht is the chief seat of the cotton industry; Arnhem the chief seat of inland trade. Haarlem has flax manufactures and is also noted for trade in flowers. Groningen is a centre of the butter trade. Flushing and the Hook of Holland are minor ports. (For other ports see chap VII) Holland has through railway communication with Germany,

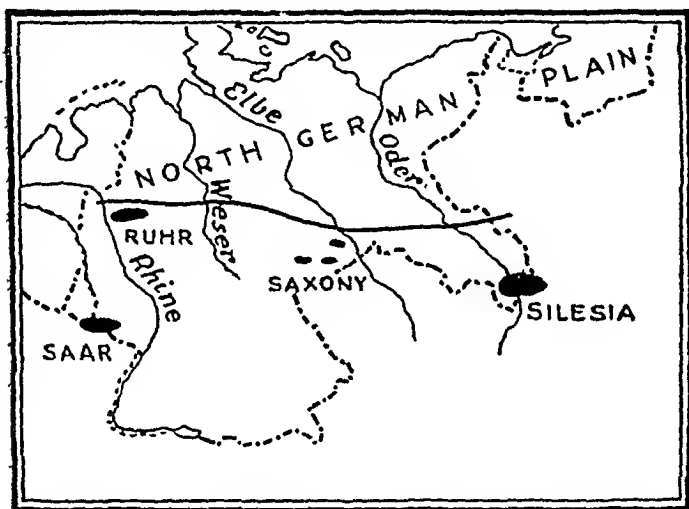
and the country is well served by rivers and canals. The chief exports of Holland are dairy products, textiles and coal. The imports consist of machinery, iron and steel goods, raw cotton, wheat and flour, mineral oil and coffee.

DENMARK, though outside the Scandinavian Peninsula, is often classed as a Scandinavian country. Actually it consists of the peninsula of Jutland and a number of islands lying between the two peninsulas of Jutland and Scandinavia. The country has an area of 16,576 sq. miles and the total population amounts to $3\frac{1}{2}$ million. Geographically the whole of Denmark is only an offshoot of the Great Plain of Europe, and has no similarity either in surface relief or in geological structure with the mountainous Scandinavian Peninsula. The surface of the country is gently undulating rather than flat, although the land everywhere is only a few hundred feet above sea-level. Considerable tracts in the west coast are waste land, covered by sand dunes deposited by the sea; and it has been necessary to plant stout trees in order to prevent the sand from blowing inland, especially because the country lies in the Westerly Wind Belt. The greater part of the land is under crops, and owing to the smallness of the country intensive agriculture is practised. The soil, however, is much similar in general character to the North German Plain—poor and of glacial origin. But the highly industrious Danes have very nearly transformed the land, and the crops produced are of very good quality. The principal agricultural products are *wheat, oats, sugar-beet, barley*, and *margarine*. Cattle-farming and pig-rearing are scarcely less important than agriculture, and indeed from the point of view of foreign trade its importance is of the very first magnitude. With the exception of certain clays and lime-chalk Denmark has no minerals. But there are

many factories for making *butter* and *cheese* from milk, *sugar* from sugar-beet, *beer* from barley and oats and a few other products of a like nature. And what is more interesting still is the 'import' of electric power from Sweden for industrial purposes. The *fisheries* on the shallow west coast are important, and there are 'nurseries' for fish especially in the Lim Fjord. The capital and chief port is **Copenhagen** or **Kjøbenhavn**. **Esbjerg** is the chief west Towns. coast port and fishing centre. **Aarhus** and **Aalborg** are the chief port on the east of Jutland, and **Odense** is the chief port of Fyen. There are railways connecting all the important centres; but the most interesting system Communi- of communication is that of train ferries, and it is now cations possible to travel from Copenhagen to Berlin by these. Denmark has been linking up her railways by enormous bridges across the narrow fjords and straits. Denmark's exports consist almost entirely of butter, cheese, bacon, eggs and live-stock. The principal imports are of textiles and other manufactured foods, coal and food-stuffs.

GERMANY. North Germany is a part of the Great European Plain, while in the south it covers a considerable Position tract of the mountainous region of Central Europe. On the and Extent. east and west, however, her boundaries are scarcely defined by geographical limits, except for the river Rhine which roughly defines the borders between Germany and France. Germany thus falls into two broad physical divisions: (a) *The North German Plain* and (b) *The Southern Highlands*. In contrast to France and the British Isles, Germany Natural has a very short coastline, only along the Baltic and the Regions. North Sea. The climatic conditions of Germany are marked by some degree of continentality as is only natural owing to her more or less central position on the mainland of Europe. Nearly 33 per cent, of the total area is covered by

forests, yielding a considerable output of softwoods, about 17 per cent, classed as pastures; and roughly 45 per cent., as arable land; thus leaving only about 5 per cent., of the land as waste. This agreeable state of affairs speaks well of the industrious nature of the German people; for the soil is not naturally so fertile as it might appear from this



THE PHYSICAL DIVISIONS AND COALFIELDS OF GERMANY

account The Northern Plain has, on the whole, an indifferent soil, which the Germans have made good use of by planting *potatoes*, one of the chief sources of industrial alcohol The leading cereal in Northern Germany, however, is *rye*, which furnishes another point of evidence as to the poor quality of the soil. Next to rye *oats* occupy the largest acreage in northern Germany. But *wheat* and *barley* are cultivated principally in the mountainous south, where the soil is generally better and the climatic conditions much more varied because of variations in the aspect of individual mountain slopes and valleys. And one of the

most important crops of Germany is the *sugar-beet*. But strange as it may seem, *hay* occupies the largest acreage in Germany with about 33 per cent. of the total arable land under it; and this may be attributed to the large number of cattle reared in the country. But the number of sheep is small, comparatively speaking. Germany has big interests in the North Sea fisheries. The mineral output of Germany is quite considerable, and in all probability she is second only to Great Britain in the total value of her mineral output. Her coal reserves are large, and the annual production of coal, including also brown coal, is normally about two-thirds of that of Britain. The largest coalfield is in the Ruhr district. The Upper Silesian coalfield also belongs wholly to Germany now. There are smaller coalfields in Saxony. The next most important mineral is iron, obtained mainly from the mines of Lorraine. There are smaller ironfields in the valley of the Sieg, a tributary of the Rhine. But the output is not sufficient for her own requirements, and Germany has to import large quantities of iron ore from Spain and Sweden. From Southern Germany—especially from Silesia—are obtained lead, zinc, and copper, which are often found in association. Huge quantities of potash salts are obtained from Saxony. Before the last Great War (1939-45) Germany was the most highly industrialised country of Europe. Fifty per cent., of the employed population was engaged in industry and commerce and only thirty per cent., in agriculture.¹ This

¹ Economic life in post-war Germany is in a chaotic condition. Most of the industrial areas are in a shattered state due to bombing and are lying idle or part stripped. The future of German industries is uncertain. But this is certain that—whatever may be decisions in the peace conference—Germany will not be given a chance in the near future to restore her military potential. A move in this direction has already been taken by the adaption of the "Pastoralisation" policy of Mr. Morgenthau in the Montreal Conference.

industrial development was due to the large resources of coal, iron ore and common and potash salts. Germany's salts deposits enabled Germany to hold the leading position in the *Chemical industry* in Europe till 1939. As regards textiles Germany's position was not so good. The *textile industries* of Germany are centred mainly in the Saxony region, particularly at Chemnitz, Zwickau and Leipzig. Dresden, lying in this region, is however, famous for articles of porcelain and China clay. The *heavy industries* are located in two regions—Westphalia and Silesia. In the Westphalian region are the great industrial towns of Essen, Dusseldorf and Duisburg, noted for the basic industries of iron and steel manufacture; the town of Solingen, specialising in cutlery; and the lesser industrial towns of Crefeld, Munchen-Gladbach, and Aachen. The town of Cologne, however, carries on various industries. The other region of heavy industries is in Silesia. The ports of Germany have already been dealt with (Chap. VII). The railways of Germany naturally centre on Berlin, the capital. And like France, Germany has made extensive use of inland waterways. All the great rivers—the Rhine, the Elbe, the Oder—are now navigable up to the German frontiers and often beyond them. These rivers have all been canalized and interlinked by means of excellent canals, and the inland waterways system of Germany now centres on Berlin. The *Dortmund-Ems Canal* links Emden with Dortmund, and unites with the Rhine navigation, linking up Strasbourg, Frankfurt, and Cologne with Rotterdam. An easterly branch from the Dortmund-Ems Canal crosses River Weser and unites with the Elbe, linking Minden, Linden, Hanover, and Magdeburg. The Elbe links Cuxhaven, Hamburg, Dresden, and Prague, and the whole line is linked in the north with Kiel through the famous *Kiel Canal* (a ship-

canal), and with Berlin in the centre by means of various branches. The Oder links up Stettin, Breslau, and Kosel, and of course Berlin. The *Oder-Vistula Canal* links up Berlin with Danzig. The total length of inland waterways is upwards of 7,500 miles.

Pre-war Germany was mainly an exporter of manufactured goods and importer of raw-materials and food-stuffs. 80 per cent, of her exports consisted of manufactures. The principal exports were iron and steel goods, textiles, coal, chemicals and drugs, paper, copper goods, glassware and stationery. The only agricultural product exported was sugar. The imports were coffee, butter, wheat, cotton, wool, petroleum, iron-ore, copper and timber.

POLAND for the most part lies in the Great European Plain, but stretches from the Baltic Sea to the Carpathian Mountains. Her only natural frontiers, if she has any, are, therefore, in the south; on all other sides she marches with neighbouring Powers, particularly with Germany on the one hand and with Russia on the other. Extensive marshes alone intervene between the main territory of Poland and Germany on the west, and between Poland and Russia on the east. Much of Poland's long array of difficulties have originated from her lack of natural frontiers. she had long been a prey to the aggressive designs of Prussia and Austria on the one hand and of Russia on the other, and indeed she had not only groaned under the yoke of foreign rule, but had actually been partitioned between Austria, Prussia, and Russia until at the conclusion of the Great War (1914-18) her independence was restored by the victorious allies. Modern Poland, although much smaller than the ancient kingdom of the Poles, is, however, larger than the British Isles. But her present difficulties can largely be traced to past factors. Only about

Foreign Trade.

Position

Population problem

half the population of the Polish Republic are Poles, while the other half consists of Germans, Russians, and Jews whose forefathers had readily settled in Polish territory owing



A GENERAL MAP OF POLAND

largely to the comparative ease of settlement there. In the Silesian coalfield region, for example, the bulk of the urban population is of Germanic origin, while the rural areas are mainly or solely Polish. On the eastern borders, again, most of the areas similarly exhibit a close intermixture of

Poles with Russians and Jews. Again, the 'Polish Corridor,' which is Poland's only outlet to the Baltic Sea, cuts off Pomerania or Eastern Prussia from the rest of Germany, and the population of the great port of Danzig is so predominantly German that it had to be set up as a 'free city,' and although Poland had been granted special privileges regarding the use of this only outlet for her merchandise, it soon proved to be an apple of discord, and the Poles had to develop the small fish-port of Gdynia for their own use. Poland is transitional between an agricultural Eastern Europe and an industrial Western Europe, though if the efforts of Russia meet with success the contrast will be reduced. The country naturally falls into two broad divisions: (a) *Northern Poland* or the *Plain of the Vistula River*, and (b) *Southern Poland* or *Galicia*. The climate is of the continental type because of the country's situation in the heart of Europe, and consequently the rivers are frozen for a considerable part of the year. Northern Poland or the Plain of the Vistula, which occupies the greater part of the country, resembles the North German Plain in general characteristics; large areas are covered with forests and marshes such as the Poznan or Posen marshes on the German border, and the Pripet marshes on the Russian border. Economically this is essentially an agricultural country. The climate, however, is too severe for wheat, and the principal crops are *rye*, *oats*, *barley*, *potatoes*, *sugar-beet* and *flax*. Cattle farming and the rearing of pigs are important. Southern Poland or Galicja, which comprises the forested slopes of the Carpathians, is pre-eminently a mining region. there are rich oilfields in the sub-Carpathian Belt, especially at Boryslaw (near Lwow), and very important salt deposits near Kracow. Farther east there is the great

Regions.

Products.

Minerals
and
Industries.

Riga is blocked by ice in winter, rendering the capital useless as a port for several months of the year. The ports of Libau and Ventspils (Windau), however, remain open nearly all the year. The republic of Latvia was incorporated into the U. S. S. R. at the outbreak of European hostilities.

LITHUANIA lies south of Latvia, and agrees with it in general characteristics. Besides *timber* and *flax*, *dairy produce* forms an important item of export. The republic is distinctly handicapped by the shortness of its coast-line. The capital is Kaunas or Kovno, and Memel the only port

MEDITERRANEAN EUROPE

The Peninsula of Iberia is the westernmost of the three large peninsulas of Southern Europe. It comprises the two republics of Portugal and Spain. The whole peninsula is cut off from France and the rest of Europe by the lofty *Pyrenees* and consists of a high plateau, called the *Meseta*. The plateau is bounded by the *Pyrenees* and the *Cantabrian Mountains* on the north and by the *Sierra Nevada* on the south. On the south the narrow Straits of Gibraltar separate it from the continent of Africa. A number of rivers such as the Guadalquivir, Guadiana, Duro, Tagus, and Ebro cut deeply through the plateau. The northern and north-western parts of the peninsula, however, form a part of the climatic zone of North-Western Europe, and hence have rainfall all the year. The remainder of the peninsula has a Mediterranean climate. The typical vegetation of the northern and north-western parts is, therefore, deciduous forests, in the river valleys of these regions there are rich grasslands, similar in general character to those of Devon

and Cornwall, Great Britain, or of Normandy and Brittany in France; these grasslands are eminently suitable for cattle farming. The remainder of the peninsula offers varied characteristics: the Meseta has a modified Mediterranean climate; the climatic conditions of northern Meseta are quite typically transitional,—in some respects they agree with those of North-Western Europe, in others with those of the Mediterranean Lands. In winter this region is generally too cold for Mediterranean products, except a few stretches of fertile land where wheat can be cultivated. Southern Meseta has a more typical Mediterranean climate; but the region is generally deficient in rainfall and so too arid commonly for agriculture. It is therefore largely covered by poor grassland furnishing indifferent pastures. But in the more fortunate tracts it is possible to grow various Mediterranean products. The Mediterranean coastlands naturally have a typical Mediterranean climate, and it is here that the typical Mediterranean crops are grown. There are small strips in this region where the climate is hot enough for rice and even for the date-palm. In the whole of Europe rice is cultivated only in Italy and Spain, and the date-palm only in the latter.

The plateau is built up principally of ancient metamorphic rocks, usually associated with minerals, or are actually mineralised to a great extent, and that is why Spain has been famous for ages for her mineral wealth. Along the northern rim of the plateau formed by the Cantabrians are large deposits of coal and iron, especially round Oviedo. Iron and other metallic minerals are found in the south also. The chief iron producing areas of Spain in the order of importance are the province of Vizcaya (Biscay), the Basque provinces, Santander, Murcia, Almeria, Malaga, and Lugo. Lead is obtained in the region of the Sierra Morena,

Geology
and
Minerals.

especially at Linares, in the mountainous tracts near the port of Almeria, and in the region of the Puerto de Despenaperros. The principal copper mines are in the region of Rio Tinto. Silver is found in association with lead at Linares and various other places. Some of the largest quicksilver mines exist in the region of Almaden. Zinc, and various salts are also abundant in Spain. Portugal, however, is much less fortunate than Spain in minerals, especially in coal.

PORTUGAL with an area of 35,500 sq. miles, occupies the greater part of the West Coast of the peninsula. About 50 per cent., of the entire territory is waste land, and a considerable part of the remainder covered by oak forests. Rainfall is heaviest in the north, where the chief crop is *maize*. This is also the richest cattle farming region of the republic. The chief agricultural products of the comparatively arid south are *wheat* and *maize*; and large numbers of pigs are also reared in this region. On the mountains the only notable crop is *rye*, and large numbers of sheep and goats are kept there. But the most important of the commercial products is *wine*, which alone accounts for more than a quarter of the total value of exports. Next comes *fish*, followed by *cork*, *coal*, *fruits* and *olive oil*. Portugal alone supplies half the world's requirements of cork. Lisbon is the capital and chief port. Oporto is famous as the 'port-wine' port. Setubal is the chief seat of fishing industry. The foreign trade of Portugal, however, shows an adverse balance, during 1931-35 the total value of imports exceeded that of exports by more than 80 per cent. The exports consist chiefly of wine, fish (Sardines mainly), cork, timber and fruits. The imports are wheat, machinery, textiles, coal and petroleum.

SPAIN with an area of 196,607 sq. miles, occupies the greater part of the Iberian Peninsula. The country falls into several natural regions: (a) *The Northern Coastlands* are a mountainous region formed by the Cantabrian Mountains and extremely narrow and intercepted coastal areas. The climate is akin to that of North-Western Europe, and so the region has precipitation all the year round. This is the richest and most thickly peopled part of the country. The mountains are clothed by beautiful *pine forests*, and the region is rich in minerals, especially *coal* and *iron*. The principal food crop is *maize*, and the rich grasslands are well suited for *cattle farming*. (b) *The Central Plateau* (Meseta) occupies the greater part of the country. The climate is arid and cold, and the soil largely unsuitable for cultivation. *Wheat*, however, is the principal crop on more fertile areas. On the pastures sheep are kept and fine *wool* is obtained from them. (c) *Southern Spain*, corresponding roughly with the valley of the Guadalquivir, is a sheltered and warm area. The principal products are *oranges*, *lemons*, the *vine*, *sugar-cane*, and *sugar-beet*; the last two flourish on irrigated areas. The region is also rich in minerals, especially *copper* and *iron*, copper is obtained near Huelva, and iron from the Sierra Nevada. (d) *The Mediterranean Coastlands*, however, are in the rain-shadow of the high Meseta; but the land is irrigated from the mountain streams. The principal products are the various Mediterranean fruits such as *olives*, *grapes*, *oranges*, *lemons* etc. The capital is Madrid in the heart of the Central Plateau. Valladolid in the Plateau region is the milling centre of the wheat of this region. Oviedo is the centre of the coal-mining district of the Northern Coastlands. Bilbao and Santander are the chief ports of the Northern Coastlands, famous for the export of iron

ore. Seville is the largest town and port of Southern Spain. Other ports of this region are Malaga and Cadiz, and the rock fortress of Gibraltar (British) is also in this region. Valencia and Catagena, on the Mediterranean coastlands are famous as fruit ports. Murcia is an inland centre of this region. Saragossa is the chief centre of Ebro Basin which constitutes the north-western part of the Mediterranean coastland Region. Barcelona is the largest port and the seat of textile manufacture. The total volume of trade is very low per head of population. The chief exports are oranges, wine, grapes, olive oil, cork, esparto grass, iron ore and copper. The imports are coal, petroleum, cotton goods, machinery etc.

ITALY is essentially a Mediterranean country. It is roughly of the same size as the British Isles, (120,000 sq. miles) and has about the same number of people (42 million). Physically the country falls into three broad divisions: (a) *The Alpine Region* in the north, formed by the southern slopes of the Alps and associated valleys; (b) *The Plain of Lombardy*, also in the north, formed mainly by the great Basin of the Po; and (c) *Peninsular Italy*, down which runs the mountain backbone of the Apennines. These divisions correspond with the principal climatic zones. The Alpine Region is not totally cut off from Mediterranean influences because of the general west-to-east alignment of the valleys. But the Plain of the Lombardy is cut off from them by the mountain spurs of the Apennines, with the result that in the cold season it is often below freezing point there, but very hot in summer. The climate of Peninsular Italy is, of course, typically Mediterranean, and warmer and damper than that of the rest of the country. Nearly 20 per cent., of the total area of Italy is classed as woodland and forest, another 20 per cent.,

covered by rough pastures, and the bulk of the remainder Products.
 cultivable. The chief crop is *wheat*; but Italian wheat is
 generally hard. Other agricultural products include *oats*,
maize, *rice*, *olives*, *vines*, and *lemons*—the last especially
 in the island of Sicily. Asses and mules perhaps out- Animals.
 number other domestic animals in Italy; they are more
 important as transport animals than horses in Southern
 Europe. Goats, again, far outnumber the sheep. Italy
 is poor in minerals; having no coal and oil she naturally
 lacks the essential basis of modern industry. The bulk of
 her coal requirements is purchased from Britain in times of
 peace; in fact, she was for many years Britain's largest Water-
 customer of coal. But she has large water-power power.
 resources, much of which has already been harnessed in
 the service of her manufacturing industries. And this has
 naturally determined the situation of her great industrial
 towns such as Milan and Turin in the northern plain where
 water-power is easily obtained from the Alpine region. But Minerals.
 Italy has good quality iron ore, though the reserves are
 small, in the islands of Sicily and Elba. Sicily has large
 deposits of sulphur as well, and the island of Sardinia is
 believed to be fairly rich in various minerals. The density
 of population being very high the pressure on the land
 is quite considerable; and she is in great difficulties as
 regards getting relieved of the pressure of population. Italy
 is still more an agricultural country than an industrial one;
 but she is fast becoming an industrial country. Prior to
 her entry into the last European War manufactures gave
 employment to more than four million people. The largest
 industrial town of Italy is perhaps Milan, where there are
 cotton and silk mills as well as machinery and railway work
 shops. Turin has also developed railway and machinery
 workshops. There are cotton mills in Naples, where Industrial
 centres.

sugar-refining and engineering are also rapidly becoming important. Como and Bergamo are also important silk-spinning towns. Woollen manufacture is also gaining in importance. The ports of Italy have already been dealt with (Chap. VII). Italy is distinctly handicapped by the scarcity of raw materials and foodstuffs. The bulk of her cotton requirements is imported from the U. S. A. and India. Other imports are coal, wool, wheat, silk, iron and steel, machinery and petroleum. The principal exports are silk and other textiles, wine, fruits and olive oil.

MALTA and **GOZO** are two islands holding the key to the route between the eastern and western regions of the Mediterranean Sea. They are in British hands, and serve as naval bases.

ALBANIA is an undeveloped mountainous country between Greece and Yugoslavia; it is inhabited by hill tribesmen. The capital is *Tirana*; and there are good natural harbours at *Durazo* (Durrës) and *Valona* (Vlora). It is now a republic.

GREECE, the forerunner of European civilisation, occupies the southern part of the Balkan Peninsula, and includes an archipelago and the large island of Crete. The total area is only 50,000 sq. miles. The country is very rugged, and mountainous, and the climate typically Eastern Mediterranean, and rainfall low. The mountains are mostly bare; or covered with sparse vegetation; forests occur only in specially favoured mountain tracts. Owing to the extreme scarcity of rains it is difficult even to find sufficient water for irrigation. The settlements are therefore, concentrated in the coastal tracts, where the soil is generally of rich alluvium. The principal food grains are wheat, barley, and maize; no surplus is available for export. But Greece is noted for fruits such as olives, oranges, figs,

lemons and grapes; and *currants*, together with *tobacco*, are the staple export of the country. Sheep are reared especially in Northern Greece, and *wool* is obtained, but it does not enter into the export trade. *Honey* is obtained from Hymethus near Athens, and it often enters into foreign trade. Some minerals are available in small quantities such as *iron* Minerals. ore near Laurion in Attica and in the island of Seriphos, *chrome* in Thessaly, and *silver-lead* near Laurion. Greece is essentially an agricultural country, and her main industries are connected with the production of olive oil, wine, cheese, leather and soap. The capital is Athens, and its port is Piraeus. The port of Salonica serves mainly as the Towns. outlet for Yugo-Slavia, and is the chief seat of the carpet industry. Patras is the principal currant port. Volos is the main outlet and inlet of Thessaly, and has been provided with a break-water. Candia is the principal town of Crete. The foreign trade shows an unfavourable balance; the imports being valued at twice as much as the exports. All the exports are specialised agricultural products. The imports consist mainly of grain, textiles, coal, raw cotton etc.

TURKEY now occupies a small territory in Europe around Istanbul.

CENTRAL EUROPE AND DANUBE BASIN

SWITZERLAND with an area of 15,940 sq. miles. Position. is a small republic in the heart of the mountains of Europe, with frontiers against France, Germany, Austria, and Italy. In its physical features the country is Natural regions. divisible into three broad units: in the north lies a part of the *Jura Mountains*, the southern half is formed by the principal chain of the *Alps*; and between the two lies the *Swiss Plateau*. The country is not very fertile, but the people have made the best possible use of a bad situation

The plateau region is the most developed agriculturally, and contains the bulk of the population. The crops are, on the whole, similar to those of the adjacent parts of France and Germany. But *dairy farming* is even more important than agriculture, and *cheese* and *condensed milk* form important items of export. The general moistness of the climate on the exposed mountainous tracts and the windward slopes encourages a luxuriant growth of pasture-grasses, and about 70 per cent., of the useable land is devoted to cattle-rearing. The cattle graze on the mountain pastures in summer, and are brought down to the valleys in winter as they become snow-covered in the cold season. About 30 per cent., of the total area, exclusive of forests and waste land, is devoted to crops. Switzerland is poor in minerals: there is little or no coal; the output of iron, chiefly from the Gonzen mine, is quite small; so is also the case with manganese, which is also worked in the Gonzen mine. Salt is worked at Bex and elsewhere, and among other mineral products can be mentioned *asphalt* and *cement*. But Switzerland possesses large reserves of water-power, estimated at 4 million horse-power; of this total reserve about 20 per cent., has actually been developed. The development of water power has actually transformed Switzerland into a manufacturing country, and the bulk of the country's exports now consists of manufactured articles. Nearly the entire railway system of the country has now been electrified, and so have also been all the factories. But transport is expensive, and so it has been necessary for Switzerland to specialise in the manufacture of small objects—watches and clocks, scientific instruments and apparatus, jewellery, fine silk materials, fine cotton goods etc. Nearly half of the total population of 4 million is engaged in industry and commerce. The capital is Berne on the river Aar; it is one of the important seats

of silk manufacture. Other seats of silk manufacture are Zurich and Basle. The famous city of Geneva, the headquarters of the League of Nations, specialises in the manufacture of watches and clocks. Neuchatel is also noted for watches and clocks. Vevey is a centre of the milk-tinning industry. The manufacture of textile and electrical machinery is done especially at Oerlikon and Baden. The magnificent scenery of the Swiss Alps attracts tourists from all over the world. Hotel industry is of great importance in the Alpine zone. Switzerland's central position has made it the meeting place of various important routes. Bern and Vevey are connected with Milan, Venice and Trieste through the Simplon Tunnel which lies in Switzerland; another important railway tunnel is the St. Gothard. The Mont Cenis Tunnel through which runs the railway between Italy and France, and the Brenner Tunnel which connects Italy and Austria by rail are, however, outside Switzerland. Switzerland has no port and no coast-line; Antwerp therefore serves as the principal port for export, and Rotterdam as the principal port for imported commodities. The main *items* of export are *manufactures*—watches and clocks, machinery, fine cotton and silk goods, and cheese and tinned milk. The principal *items* of import are *raw materials*, and *foodstuffs*—cotton, silk, wool, metals, wheat, sugar etc.

Industrial centres.

Communications

Trade.

AUSTRIA is a typical Alpine area. It has an area of 32,360 sq. miles with a population of about 6¼ million. In many respects it is like Switzerland, and like the latter it, too, readily falls into three broad physical units: the eastern end of the Alps, known as the Tyrol, covers nearly three-quarters of the total area; then there is the valley of the Danube, which cuts through the east of the country; lastly there are the hills to the north of the Danube,

resembling the Jura Mountains of Switzerland. The most populous and important part of the country naturally is the Danube Valley, where the chief crops are *wheat* and *maize*; those of the Alpine region are *rye* and *oats*; but *forestry* is more important here than agriculture, and large tracts are devoted to *cattle farming*. Austria is rather rich in minerals; there are fairly large deposits of *iron ore*, *lignite*, *lead*, *zinc*, *copper*, and *salt*. The principal seats of iron and steel industry are at Steyr and Donawitz. The capital is Vienna, the only large town in present-day Austria, situated just where the Danube leaves the Alps and enters the Hungarian Plain; all traffic between Southern Germany and the Hungarian Plain converge on it. The city was once the seat of several important industries; at present its only industry of note is that of cloth-making.

HUNGARY is a small inland country bordered by Austria on the west, Czechoslovakia on the north, Rumania on the east and Yugoslavia on the south. Nearly in all respects it is a direct antithesis to Austria; in contrast to mountainous Austria it is almost entirely a plain; whereas Austria is fairly rich in various minerals, Hungary is very poor in mineral resources except for a little coal and some lignite; the people of Hungary are quite distinct from the Austrians, who are essentially a Germanic race; the Hungarians are Magyars and said to be racially allied to such Asiatic races as the Turks. The fertile plains of Hungary were covered by beautiful grasslands; these have now yielded place to various crops—*wheat* and *maize* principally in the richer south, and *rye*, *oats*, and *barley* in the comparatively poor (though not actually quite poor) north. Other important crops are *sugar-beet*, *hemp*, and *flax*. The country is suitable for *cattle*, *sheep* and *pigs*. The capital is Buda-Pest, a twin city on the Danube. Szeged is the chief

town in the south, but it is more like an agglomeration of villages than like a town, and so are also the so-called towns of Debreczen, Keeskemet, and Szabadka. Hungary is an Trade. agricultural country, supplying the neighbouring regions with its own produce, and receiving in return such manufactured goods as clothing and textiles. Her largest customer still is Austria, where goes nearly a third of all the exports. Next comes Czechoslovakia for about a fifth of the exports. Germany probably stands third among her customers. And these three states between them supply about 55 per cent, of the imports of Hungary.

CZECHO-SLOVAKIA is also another 'succession History. state' which arose in 1918 largely out of the former Austro-Hungarian Empire. It was carved out as a union of the Northern Slavs. A large part of it was absorbed in the German Reich in 1938 as a result of the notorious Munich Agreement. The whole of it is now liberated. The territory includes the plateau of Bohemia known also as the Bohemia. Czech Plateau, where there are large deposits of good coal and lignite as well as some iron ores. The region is drained by the Elbe River and its tributary, the Moldau. The rich alluvium of the river valleys yields a varied harvest of *potatoes, rye, wheat, sugar-beet and hops*. And here also have sprung up various manufacturing industries, and the region is dotted about by cotton mills, paper mills, saw mills, glass and chemical factories, iron and steel works, etc. The capital, Prague (*Praha*), and the other important industrial town of Pilsen lie in this region. The Moravian Moravia. lowlands, in the centre of the country, are similar in general character to the neighbouring Hungarian Plain, and the principal products of this region are *barley, maize, sugar-beet, and fruits*. There are rich coalfields here also; besides in the south of the region, a part of the great Silesian

Coalfield lies in the north. And naturally therefore various manufacturing industries have sprung up in this region also. The chief centre of the region for woollen goods and machinery is Brno. East of the Moravian Lowlands lie the Carpathian Mountains and associated valleys—a region often called simply Slovakia. Large areas of this region are forested, and many places are rich in minerals, but it is the least developed part of Czecho-Slovakia. The principal exports are manufactured goods like textiles, glass, iron and steel goods, coal, sugar, etc. The imports consist of raw materials and cereals.

YUGOSLAVIA is another 'succession state' that arose in 1918. It is the union of the Southern Slavs. The Alpine region of the country, formed by a few small spurs of the Alps, is roughly coincident with the province of Slovenia, and resembles the neighbouring state of Austria in general characters. The Adriatic Coast, known also as Dalmatia or the Dinaric region, is also mountainous, being formed largely by the Dinaric Alps. The region is generally very dry and full of limestone mountains. The principal products of the more fertile tracts of the region are Mediterranean *fruits*. At the junction of the Alpine region and the Dinaric region some minerals are found. The Northern Plain of the country is actually a part of the great Hungarian Plain; it is, however, entirely cut off from Mediterranean influences, and has a continental type of climate. But the products of the naturally rich soil agree with those of Hungary, and are represented mainly by *wheat, maize, tobacco, and sugar-beet*. The Southern Region of the country is the largest natural unit, and has varied characteristics. The hills are partly forested and partly covered by pastures suitable for sheep and cattle. The sheltered valleys yield *wheat, maize, and fruits*.

especially plums which forms an important item of export in the dried state. The *vine*, *sugar-beet*, *hemp*, and *tobacco* are also grown in suitable areas. And there are, in this region, deposits of various minerals, especially of *iron* and *lead*. The capital is Belgrade, on the Danube; it lies at the northern end of the Southern Region. Nish is on the route to the Greek port of Salonika. On the Adriatic Coast and near the Italian port of Fiume has been built the new Yugoslav port of Susak. Farther down are the ports of Split, Dubrovnik (Ragusa), and Kotor (Cattaro). Sarajevo is an important inland town; Zagreb is the principal town of the Northern Plain. The Yugoslav ports are difficult of access, and the country's main outlets are the Greek port of Salonika on the Aegean Sea, and the Italian ports of Trieste and Fiume. The Danube, on the other hand, serves as the highway into the northern countries. The principal exports are *timber*, *fruits*, *animals*, *wheat*, and *maize*; the principal imports, *manufactured goods* generally. The balance of foreign trade is, on the whole, favourable.

RUMANIA is divided into two parts by the Carpathian Mountains and the Transylvanian Alps. The mountains are covered by forests, yielding valuable *forest products*; and along the southern foothills lie a number of rich *oilfields*, which constitute the principal source of national wealth. The country is, moreover, rich in other minerals; for among the difficult hill region in the west are important deposits of *gold*, *copper*, *silver*, *lead*, *iron*, and *coal*, but the output of minerals is small. To the south-east of the mountains lie the Wallachian Plain, formed mainly by the valley of the lower Danube. Geographically it may be regarded as a part of the steppelands of Russia. The climate is continental and the rainfall low. It has now

Towns.

Trade.

Regions
and
Resources.

been transformed into one of the major wheat-lands of the world. Besides *wheat*, the other crops grown are *barley*, *maize* and *oats*, and it is from here that the bulk of the surplus of agricultural produce is obtained for export. The capital, Bucharest, lies in this region. Other important towns of this region are Galatz and Braila, both river ports on the Danube. Constantza, on the Black Sea, is the most important port of Rumania; it remains ice-free all the year round, and oil from the refineries at Ploesti is sent by pipe line to Constantza for export. The principal items of export are *wheat*, *maize*, *timber*, *oil*, and *livestock*; the principal items of import are *cotton* and *woollen goods* and *machinery*. The foreign trade has long been maintaining a favourable balance.

BULGARIA is a small mountainous country, and falls into three natural regions: (a) *The Lower Danube Valley* in the north, (b) *The Balkan Mountains* and the *Rhodope Mountains* in the centre, and (c) *The Valley of the Maritza River* in the south. It is essentially an agricultural country; the principal crops are *wheat*, *maize*, *tobacco*, *sugar-beet*, and *fruits*. There are valuable forests of *oak* and *beech* on the mountains; and the country owns large numbers of sheep, goats, and pigs. The capital is Sofia. The centre of the Maritza Valley is Philippopolis. Ruschuk is a Danube port, and Varna the Black Sea port. The principal exports are *eggs*, *wheat*, *maize*, *tobacco*; the principal imports, *cotton* and *woollen goods*. The imports are generally slightly higher in value than the exports.

EASTERN EUROPE AND SIBERIA RUSSIA

The Union of Socialist Soviet Republics

Position and Size.—The Union of Socialist Soviet Republics—an enormous territory covering an area of over 8¼ million square miles, with a population (in 1940) of 193,200,000—consists of the following sixteen Union Republics—*The Russian Soviet F. S. R. i.e.,* Russia proper; *The Ukraine S. S. R.; Belorussian S. S. R.; Azerbaijan S. S. R.; Georgian S. S. R.; Armenian S. S. R.; Turkmen S. S. R.; Uzbek S. S. R.; Tadzhik S. S. R.; Kazakh S. S. R.; Kirghiz S. S. R.; Karelo-Finnish S. S. R.; Moldavian S. S. R.; Estonian, Latvian, and Lithuanian S. S. R.* With the end of the recent European conflict, however, has been witnessed the swallowing up by the U. S. S. R., of part of Poland, all the three Baltic states and a small fragment of southern Finland. However, the U. S. S. R., is the largest compact political unit in the world. The whole of the Soviet territory lies far beyond the tropics—in the Temperate and the Frigid Zones; and, although bordered on nearly all sides by oceans and seas, Russia has few outlets to the open ocean: the Arctic Ocean on the north allows passage only for two or three weeks in mid-summer; the Pacific coast on the east remains ice-bound in winter; the passage through the Black Sea, open all the year, is, however, under the control of Turkey at the Bosphorus and the Dardanelles; on the west, Russia is guarded by Rumania, Poland, and the three small Baltic states recently absorbed in the U. S. S. R.; and Finland and Estonia, between them, have complete control over the entrance to and exit from the region of Leningrad.

Physical Features.—The enormous territory of the U. S. S. R., may be divided into the following broad physical units (a) *The Plain of European Russia*, this is actually the famous Russian Platform, and it occupies nearly the whole of European Russia from the Arctic Ocean to the Black Sea on the one hand, and to the Caucasus Mountains and the Caspian Sea on the other. (b) *The Caucasus and Trans-Caucasia* form a comparatively tiny area in the

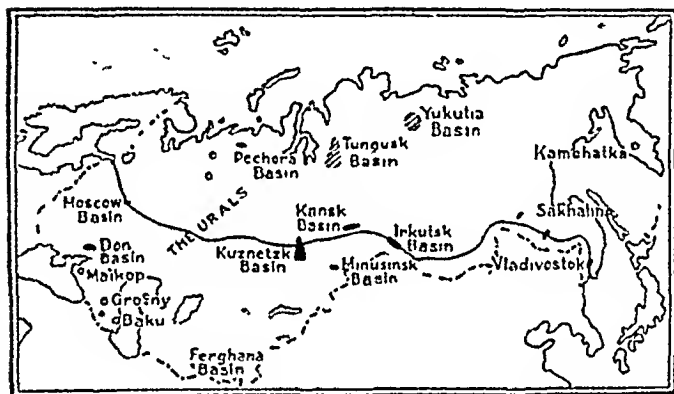


THE NATURAL REGIONS OF RUSSIA

southern part of European Russia (c) *The West Siberian Lowlands* lie east of the Ural Mountains (d) *Eastern Siberia*, bordering the West Siberian Lowlands on the east is a low dissected plateau (e) *The Far East* consists of a succession of mountain chains. (f) *Russian Central Asia* lies east of the Caspian Sea and south of the West Siberian Lowlands; it is bordered on the south and east by the mountains of Central Asia, and consists of steppelands

Geology and Minerals.—Russia is enormously rich in mineral resources. The Russian Platform consists of pre-Cambrian rocks resistant to later Alpine folding, and

is covered by huge deposits of later sediments. These later sediments contain large coal measures and deposits of lignite. One of the coal basins lies in the Arctic region of European Russia; another field yielding lignite occurs south of Moscow; but the most important coalfield of European Russia is in the Don or Donetz basin south of Moscow. Other minerals include large deposits of iron ore near the

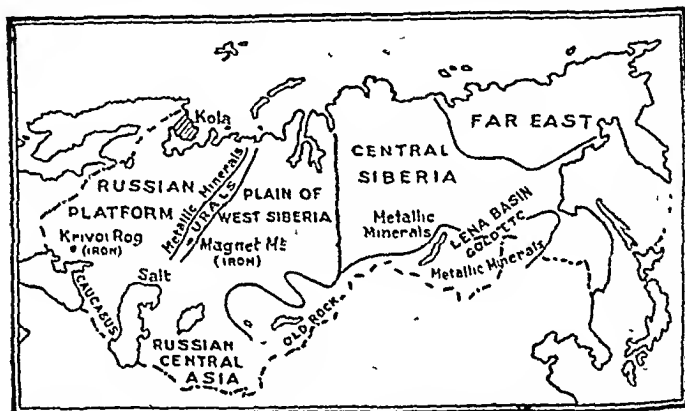


THE COAL AND OIL FIELDS OF RUSSIA

Black Sea, and nickel and apatite elsewhere. Russia is now the second greatest producer of iron and steel in the world (after the U. S. A.) There are huge deposits of wind-borne loess over central and southern Russia, and this has transformed a vast tract of the country into a rich agricultural land. The region of the Caucasus and Trans-Caucasia is formed by folded mountain chains and exposed rocks of a very remote geological age. These ancient rocks are often highly mineralised, there are large deposits of lead and zinc in the north, and vast stores of iron, manganese, copper, and aluminium in the north of this region. But more important than any of the metallic

Caucasus
and
Trans-
Caucasia

minerals is oil, which occurs along the flanks of the Caucasus. The important oilfields of the region are those of Grozny, Maikop, Baku, and Tiflis. Russia is now second only to the United States as a producer of oil. The Ural region is also largely composed of ancient mineralised rocks, yielding large quantities of iron, copper, manganese, nickel, gold, aluminium, coal, and oil. Of the various iron-fields the most important is the Magnet Mountain near



THE MINERALS OF RUSSIA OTHER THAN COAL AND OIL

the town of Magnetogorsk, an important centre of iron and steel industries. The oilfields occur along the flanks of the Urals from the Arctic Ocean to the Caspian Sea. The Soviet Union had a great coal industry around the town of Vorkuta in the Arctic region during the war, it was disclosed.

The wild Tundra of this area lying west of an estuary of the Ob river has been transformed into a thriving industrial area which the Russians call the "Transpolar Donets Basin."

Work is also starting on a new coalfield recently discovered about 70 miles northeast of Vorkuta, it is reported. There is an important coalfield on the flank of Siberia, and in the north occur huge deposits of potash salts. Along the south-eastern margin of the West Siberian Lowlands is the great coalfield of the Kuznetzk basin. The low dissected plateau of Central Siberia is also a great mass of ancient rocks, which are mineralised in places; and here we find the goldfields of the Lena basin, and various other minerals including coal in the Tungusk basin, Yakutia basin, Minuminsk basin, Irkutsk basin, and Kansk basin. There are two coal basins in the Far East, and oilfields in Kamchatka and the island of Sakhalin, while gold is of wide distribution in this region. The region, however, lies largely unexplored yet. Russian Central Asia has deposits of gold, copper, lead, tin, zinc, and coal, and the region is believed to have oil as well. Russia is now believed to rival South Africa in the production of gold. The Platinum mines in the Ural mountains form one of the world's chief sources of supply of this mineral. The country also possesses huge reserves of water-power, sometimes estimated at 33 p.c., of the world's total. Great Electrical stations have been established in the Moscow industrial region and at Dneprostroy below the last rapid on the Dnieper. Hydro-electric stations have also been installed on the Volkhov (Leningrad Area).

West
Siberia.Central
Siberia.Far
East.Russian
Central
AsiaWater-
power

Climate and Vegetation.—Russia is an enormous land mass, and the climate must necessarily be of the continental type; and indeed it is so, for the world's coldest spot lies in the heart of Siberia. But in summer temperatures of over 90°F., are sometimes recorded even within the Arctic Circle. The whole country can be divided into at least six major climatic belts: there is first the region

Basic
facts.

of Arctic Climate along the northern rim of Russia; south of this lies the belt of Cold Temperate Climate, covering by far the largest part of the country; the south-eastern margins have the Manchurian Climate, and to the south-west of the Manchurian belt is a small area of Steppeland Climate; the Steppeland Climate occurs also along the borders of the Black Sea and the Caspian Sea, and south of this is found Desert Climate; and lastly the East European type of climate occurs in the region nearest to the Baltic Sea. Corresponding to these climatic divisions are the major vegetation belts. Along the Arctic seaboard lies the *Tundra region*, with its characteristic swampy soils and mosses and lichens. South of it lies the great belt of *Coniferous Forests* which yield valuable soft-woods; the soil of the Coniferous Forest region is known as podsol,—it is ash-coloured and poor in plant food. Then there are *Deciduous Forests* in the region of East European Climate, the soil is better. South of the Deciduous Forest region lies an enormous area of rich *grassland* with scattered trees: this is the region of the famous chernozems or black earths of rich loess formation, and the region is naturally the great granary of Russia. South of the Black Earth region lie the *Steppelands* with characteristic chestnut-brown soil, which is fairly rich in plant food. Last of all, there lies the *Desert belt* around the Caspian Sea, with its red and yellow soils; but the region, though infertile, is very important to Russia as it is the only area where tropical and sub-tropical plants can be grown after irrigating the land thoroughly. Of the various animals of Russia the most important commercially are those of the fur-bearing species such as the silver-fox; and the country now produces nearly a third of all the furs entering into international trade. There are numerous reindeer in the north, and attempts have been

made to utilise them for meat and milk. The fisheries along the northern and eastern coasts are of importance.

Agriculture.—Before 1917, Russia was primarily an agricultural country. But agriculture was then in a very backward condition. After the revolution, two main changes have taken place. First, the abolition of private ownership of land, and second, the introduction of scientific methods. Under the first and second five year plans most of the small holdings were united to form Collective Farms (Kolkhozes). Large State Farms (Sovkhozes) were also established. Virgin areas, specially in Siberia and Central Asia, have been brought under cultivation, and complete mechanization has been rendered possible due to collectivisation and the level nature of land in most places. The country is the world's leading producer of *wheat, barley, rye, flax and hemp*. It is also the second largest producer of *oats and sugar-beet*. *Rice, cotton and fruits* are the most important products of Soviet Central Asia. The chief wheat-growing area is in the Ukraine, but wheat is now cultivated farther north than formerly. The rye belt is situated north of the wheat belt. In the north climate restricts agriculture to quickly maturing crops, such as rye, oats, barley, potatoes, flax, hemp and sugar-beet. Cotton is mainly grown in the fertile and well-watered Ferghana Valley lying between Tashkent and Samarkand in Uzbekistan. This region produces more than 50 per. cent., of the Union's raw cotton and large-scale irrigation schemes are constantly enlarging the area under cotton. Cotton-growing is also a major industry in Turkmenistan and Tadzikistan. The best sea-island cotton is grown here. Cotton is also grown in Kazakstan but not to the same extent as in Uzbekistan. Silk is another commodity

produced. The minor products in Siberia and Soviet Central Asia are wheat, rice, sugar-beet, rye and tobacco.

Industry.—The most important industrial region of Russia is around Moscow, the capital. This region is especially devoted to cotton and textile industries and the manufacture of clothing; but there are various metal works and plants for the manufacture of machinery and chemical products in this region. The important industrial towns of the region other than the capital are Tula, Kalinin, Yaroslavl, Ivanov, and Gorky. The abundance of coal and iron has naturally made it the principal industrial region of the U. S. S. R. But the other important industrial region—that of Leningrad—has no coal nor iron. But its situation is in some respects better as it lies along the north-western sea-board of the country. The region specialises in ship-building, particularly in the construction of timber ships and ice-breakers, and in the manufacture of miscellaneous machinery. It has also an important clothing industry. Water-power is obtained from two rivers flowing through the region.

Around the Donetz coalfield and covering a large part of the Black Earth region of the Ukraine is another seat of industry. This region specialises in iron and steel manufactures and the production of agricultural implements. There are sugar mills, flour mills, and tanning factories also. The region is rich in coal and iron. The important centres are Krivoi Rog and Rostov, better noted for the production of iron and steel. Another important region is that of the Urals and the Kuznetzk coalfield; it is also rich in various minerals including coal and iron. The principal iron and steel town of the region is Magnetogorsk; other centres include Orsk and Kuznetzk. Besides the heavy industries, this region specialises also in wood-working

and textile industries. Around Tiflis, again, there is the very important Trans-Caucasian industrial region noted for its oil industry. The principal centres are Baku, Tiflis, Grozny, and Maikop. The Kola Peninsula in the north specialises in wood-working and some metal manufactures, and Russian Central Asia is concentrating more and more upon cotton manufactures. Tashkent, Samarkand, and Kokand are old centres of Russian Turkestan. Russia under the successive Five Year Plans has made quite astonishing progress in industrialisation; of the total national wealth 70 per cent., is now derived from manufactures, and only 30 per cent., from agriculture.

Trans-
Caucasian
Region

Other
centres

Planned Economy in U. S. S. R.—The industrial and commercial life of Russia was completely disorganised in 1921, as a result of civil strife, blockade and the attempt to substitute communism for individualism. At that time, the New Economic Policy was introduced by the state, which permitted a wide measure of participation of private capital in industry, agriculture and commerce. This resulted in an improved state of affairs and by 1928 production had in many cases reached and in some had exceeded its 1913 level. The Soviet Government at that time felt the necessity of drastic re-organisation of both industry and agriculture. Thus, the *First Five Year Plan* was inaugurated in 1928. It aimed at developing industries connected with electrification, mining, metallurgy, and machine construction, for the ultimate benefit of all other branches of industry. New centres of heavy industries were opened in the East. Under the New Economic Policy, class differentiation had grown and the conflict between the peasants and the industrial workers was becoming acute. A new class of well-to-do peasant proprietors (*Kulaks*) had come into being. In order to check these evils, a radical

First
Five
Year
Plan.

change in agriculture was contemplated by the conversion of small agricultural units into either state or collective farms. It was also deemed essential to make the country less dependent upon foreign goods and to put it on a stronger material basis for its future progress. The *Second Five Year Plan* (1933-37) envisaged not only a further expansion of industries but also the establishment of a more geographical distribution of industries. Fresh centres were opened up in Soviet Central Asia. By 1937, the output of coal was four times, that of petroleum three times as much, and the capacity of electric power stations eight times as great as in 1913. The *Third Five Year Plan* came into force in 1938, and its operation continued throughout the last Great War (1939-45). It aimed at, (1) increased regional self-sufficiency especially as regards food-stuffs, fertilizers, bricks, cement etc and (2) for a further shift of the industrial centre of gravity to the east. The German invasion further accelerated the eastward movement of industries (specially heavy). These new centres in the East saved the U.S.S.R. during the critical years 1943-44, by supplying armaments and other industrial products. The Union is now working its *Fourth Five Year Plan*. It is mainly a post-war reconstruction plan, aiming at increase of agricultural and industrial output. It is reported that some new big enterprises have already been started. More attention is being paid to the industrial development in Western and Central Siberia. Work has begun on the construction of the Necnomyssk Canal in Stavrapool territory, north of the Caucasus, one of the biggest irrigation projects of the current Five-Year Plan. The canal will link the Kuban and Yegorlyk rivers and supply water to the thickly populated Yegorlyk district. Collective farms in this area will be able to irrigate some 25,000 acres

of cultivated land. There will be two hydro-electric stations on the canal, one of which is already being built. Work on the huge reservoir, in the Zeravshan river valley in the Uzbek Republic, suspended during the war, has been resumed. This will be among the largest reservoirs in the Soviet Union holding 600,000,000 cubic metres of water. From Novosibirsk comes word that a cotton textile mill, the biggest enterprise of its kind in Siberia, is being erected consisting of a spinning mill with 125,000 spindles, a weaving mill with 2,000 looms, a trimming factory and thread mill with an annual capacity of 120,000,000 bobbins of fabrics annually.

Fourth
Five
Year
Plan.

Riga, the capital of Latvia, reports an extensive new harbour-building programme to improve shipping facilities. Much of this is scheduled to be ready by the beginning of the 1947 navigation season.

Among the largest single projects of the new Five-Year Plan, all out exploitation of the copper resources at Jezkazgan in the heart of the semi-desert zone of Kazakhstan is being pushed ahead with all possible speed. The scheme for Jezkazgan, the biggest copper-producing centre in the Soviet Union will be a major feature in boosting the country's copper output in 1950 by nearly two-thirds as compared with pre-war output.

Down in Georgia, on the wild prickly grasses of the Rustav plain is rising a new industrial community around an iron and steel mill that will produce 430,000 tons of pig iron, 500,000 tons of steel and more than 380,000 tons of rolled metal a year. The plant will have two blast furnaces, six open hearth furnaces, a blowing mill and a rolling mill. A special railway line is being built to bring in coal from other parts of Georgia.

Among agricultural improvements listed are the revival of large-scale production of Siberian butter, a considerable drainage scheme in the Barabinsk steppe, extended breeding of fine-fleeced sheep and dairy-cattle, and more meat and dairy farming and market gardening around the large towns.

Communications.—The enormous extent of Russia naturally brings the question of communications to the forefront. No other country in the world can perhaps be so much exercised on the problem of conquering distance, and even with all the facilities for modern means of travel it is ten days' continuous journey from Moscow to Vladivostok by train. Moscow is the focus of railways. It is the centre of lines radiating to Samara (Trans-Sib. Ry.), Leningrad, Warsaw, Kiev and Odessa, the Crimea and Trans-Caucasia and Archangelsk. There are 60,000 miles of railway in Russia, and its regular air services now cover a route of some 30,000 miles. The rivers of Russia, however, are often shallow and they usually follow long winding routes. Many of them have now been canalized and interconnected by means of deep canals, and at the present time Russia has nearly 70,000 miles of navigable waterway. They handle only about 10 per cent., of the goods traffic consisting mainly of heavy and bulky goods, such as timber and grain, ores and oil. Among the more important of these rivers are the *Volga*, the *Dnieper*, the *Don*, the *Neva* and the *Dwina*. The basin of the Volga is connected with that of the Neva. The whole river system of the Volga was invaluable to the development of Russia in the early days of its history. The Ob, Yenesei and Lena are the important rivers in Siberia. Most of the rivers of the U. S. S. R., remain closed by ice for a period, which varies; according to the position of their basins, from three to six months each year.

Foreign Trade.—The volume of trade is very low. trade. The chief exports are Timber, Petroleum, Flax, Wheat and Furs. The imports are Machinery, Iron and Steel, Tea, Rubber, Wool, etc.

STUDIES AND QUESTIONS

1. Describe the principal coal-fields in Great Britain and show their connection with the industries of the country.

(Cal Inter 1943, Cal. B Com 1929)

2 Analyse the factors governing the climate of the Br. Isles pointing out the advantages as compared with the other regions of Europe within the same latitude

(Cal. Inter. 1932)

3 Discuss the position of U. S S R as a self-supporting economic unit. What are the commodities that this Union may need after the War, and which of these will India be in a position to supply?

(Cal. B. Com 1944)

4 Describe carefully and explain the importance of the inland waterways of France.

(Cal. B Com. 1925)

5. Describe the distribution of linen industry of Northern Europe excluding Great Britain and Ireland Where do the raw materials come from? To what extent is this industry dependent on the supply of raw materials from India?

6 On an outline map of Europe mark the places containing important deposits of iron ore Indicate also the region from which coal is obtained near the iron ores.

(Cal Inter 1928, 1937.)

7. What are the principal seats of ship-building in the United Kingdom and what are the geographical advantages for the industry enjoyed by them? What geographical circumstances tended to deprive the Thames of the high rank it once held in this industry?

(Cal. Inter 1931.)

8 Compare Scotland and England as regards (a) physical features, (b) production and (c) distribution of population.

(Cal. Inter. 1931.)

9 In what parts of Great Britain are all branches of the woollen industry most largely produced? Point out the local conditions favourable to it there and name three of the chief towns engaged in those districts (Cal Inter 1925)

10 Account for the localisation of the cotton textile industry in Lancashire. Also describe the present condition of the British cotton industry. (Cal Inter 1936, 1940, 1946)

11 Consider the position of France with regard to her supplies of (a) fuel and (b) water-power (Cal B Com 1932)

12 State briefly the prospects of France with her colonial Empire becoming a self-supporting economic unit (Cal B. Com 1932-)

13 Name the three principal manufacturing industries of Great Britain and give reasons for their location (Cal. Inter 1936)

14 What are Great Britain's sources of supply of food-stuffs and textile raw materials in normal times, how have these been affected by the war? How is Great Britain trying to counteract the shortage of these commodities? (Cal M Com 1941)

15 Describe the position of the principal coal-fields of Germany particularly as regards access to navigable waterways. Also name the chief manufacturing industries of these coal-fields (Cal B Com 1931)

16 Give an idea of coal and iron regions of Europe, and the industries which have been established there (Cal Inter 1938)

17. Describe the position of Continental Europe, excepting U S S R, and the Iberian peninsula, as a self-supporting economic unit. This region was known to be a very large consumer of tropical and sub-tropical foodstuffs and raw materials. How is the demand for these commodities being met now? (Cal B Com 1943)

18 Why is it that (a) Britain occupies the leading place in the industrial world; (b) France is not a great competitor in world trade (U.P. Inter. 1937.)

19 Make a comparative study of the iron and steel industry of England and the United Kingdom. In your discussion, include all the factors affecting the industry. (U P. Inter. 1941.)

20 Describe the general character of the manufacturing industries of Switzerland, giving illustrations, and indicate the circumstances adverse and favourable to their development.

(Cal Inter. 1932, U P, Inter. 1939.)

21. Suggest a division of France into natural regions. Give full reasons for your answer. (Cal B Com 1929, Cal. Inter. 1943.)

22. Write a brief note on the development of inland water communications in Germany. (Cal Inter. 1944.)

CHAPTER V.

ASIA

The Continent of Extremes and Contrasts

Position and Size.—Asia, with a total area of more than 17 million sq. miles, is the largest of all the continents, and occupies nearly one-third of the land surface of the globe. It is continuous with Europe, with which it constitutes the great land-mass of Eurasia covering an area of about 21 million sq. miles. The narrow isthmus of Suez connects it with the continent of Africa, and a festoon of islands link it up with Australia and the land-masses of the Southern Hemisphere generally. The continent itself, however, is situated entirely in the Northern Hemisphere. For its size, however, Asia has a rather short coast-line—only 34,000 miles, *i e*, one mile coast to every 500 sq. miles of surface. From north to south the mainland stretches between $78\frac{1}{2}^{\circ}\text{N.}$ within the Arctic Circle and the Equator (0°); no town of any importance exists at the northern limits, and the only town of importance near the Equator is Singapore ($1^{\circ}1'\text{N.}$). Although the continent includes 155° or more of longitude between its extreme eastern and extreme western points and thus covers nearly one-half of the earth's circumference, the mainland extends from 25°E. on the west to 170°E. on the east, covering well over a third of the circumference of the globe. Yet the main territory does not, for the greater part, conform to the land-mass lying within these lines, and so the position of Asia may better be determined by reference to the longitudes of 45°E. , which runs by Baghdad and Aden, and 135°E. , by Kobe, Japan. The longitude of 90°E. , running by Barisal,

Dacca, Dhubri, Lhassa, Krasnoyarsk, etc., may, therefore, be regarded as the central meridian of the mainland. The latitude of 40°N ., passing by Peiping, Kashgar, Bokhara, Samarkand, Baku, Ankara, etc., cuts the mainland into two equal halves—northern and southern. The position of the Tropic of Cancer ($23\frac{1}{2}^{\circ}\text{N}$) is also important; this line, which passes by Maskat, Ahmedabad, Jabbalpur, Calcutta and Canton, penetrates through the heart of India from east to west.

Physical Features.—Topographically Asia consists of a number of broad physical units, which may be enumerated and described as follows:

1. The Plateaus of Central Asia, forming a huge triangular territory flanked by a succession of Alpine mountain chains. From the Pamir Knot, which is itself a plateau, known as *'the roof of the world'*, issue huge mountain chains. To the south-east is the lofty Himalayan Chain, reinforced on the north by the Karakoram stretching eastward; farther north is the Kunlun which ultimately branches out in two directions—the main line proceeding directly to the east, while the other branch known as the Altyn Tagh proceeds eastward by a more northerly route; to the north-east of the Pamir Knot is the Tien Shan. The Himalayan Chain penetrates along the north of India into China, and probably proceeds across the Western plateau of China on the one hand and continues, on the other, along the border of India and Burma through the Andaman and Nicobar Islands as well as through Sumatra and Java to form the mountain festoons of the East Indies. The main chain of the Kunlun ultimately passes into the Tsingling Mountains of China, and the Altyn Tagh passes into the Nanshan or Southern Mountains of China. The

A complex of plateaus and Alpine fold mountains
Pamir Knot the central focus of mountain chains
Alpine range and their continuation

Knot on the west, and bounded by the Hindukush and the Sulaiman lies the great Iranian Plateau; an eastern fragment of this large territory, covering portions of Afghanistan and Baluchistan, is known as the plateau of Seistan. To the north-west of the Iranian Plateau and beyond the Armenian Knot lies the plateau of Anatolia bounded by the Pontic and Taurus Chains.

3. The North-Western Lowlands, forming another triangular territory to the north of the central mountainous triangle. The whole of this area, however, is not a true plain; it is bordered along the central plateaus by 'high plains' buttressed by fold mountain ridges; the basins bordering the Aralo-Caspian depression on the south-west of this lowland triangle, in Russian Turkestan, are separated by a number of hill ridges; Central Siberia, again, is a low dissected plateau, and Eastern Siberia, a complex of hills and plains not yet well explored. Western Siberia alone is a true lowland, bordered by the low ranges of the Urals on the west. The principal rivers of this region are Ob, Yenisei, and Lena.

4 The Eastern Complex of Lowlands and Mountain Festoons. The great lowlands falling within this territory are the river plains of the Amur in Central Manchuria, plains of the Hwang Ho and Pei Ho in North China, of the Yangtze Kiang in Central China, of the Si Kiang in South China, of the Mekong in Indo-China, and of the Menam in Siam. These basins are separated by innumerable spurs of ancient mountains such as, the mountains of Eastern Mongolia in Manchuria, the Mongolian Plateau, the Tsinling Mountains and the Southern Mountains in China; the

plateau of Yunan and Indo-China as well as the Great Indo-Malayan Mountains Block in Indo-China, Thailand and the south generally. A number of fold mountain curves guard these basins on the east.

5. The Southern Complex of Plateaus and River Basins, comprising the ancient tablelands of Arabia, Peninsular India, and Indo-China, and the river plains of the Tigris-Euphrates, of the Indus-Ganges-Brahmaputra, and of the Irrawaddy. These river plains separate the southern plateaus from the central mountain complex

A complex of river basins and plateaus

Geology and Minerals.—The geology of Asia is even more complicated, and authorities naturally are more at variance with regard to its basal structure than to its orography. Here it is possible only to set forth the points upon which there seems to be some measure of general agreement

The Anatolian Plateau, we have seen, lies between the Alpine chains of the Pontic and Taurus Mountains, much of the interior of the plateau is also covered with rocks of the late Tertiary period; but the hills which penetrate this Alpine cover are of folded Palæozoic and Mesozoic rocks. Such a region, we may easily anticipate, will be fairly rich in mineral resources—both metallic and non-metallic; and Turkey, which is coincident for the greater part with the plateau of Anatolia, is known to be richly endowed with mineral wealth; thus there are important coal measures especially along the Pontic Mountains; lignite occurs in several other areas. Some of the largest copper-mines in the world are said to occur to the south-east of the plateau as well as in the south by the Taurus Mountains and also in the neighbourhood of the port of Trebizond on the Black Sea. Other important minerals of Turkey are

Turkey.

fairly large deposits of various minerals such as coal, zinc, phosphates, tin, and graphite in the Tonking region; and gold, lead, tin, and precious stones in Cambodia. The principal minerals of Malaya are tin, coal, gold, phosphate, and China-clay. Besides oil, the minerals of the East Indies chiefly are tin, coal, gold, silver, iodine and diamonds; diamonds are obtained from Borneo. The vast sub-continent of China may be divided into four main geological units: (a) *The north-eastern massif* (Archean massif), formed mainly of pre-Cambrian crystalline rocks, and flanked on the west by Palæozoic fold sediments, and interspersed here and there by Carboniferous coal-measures. Included in this area are Korea, Liaotung, and East Shantung. Underlying the alluvial plain of North China is a down-faulted block of this massif (b) *The North-western Basins*, bordering the northern parts of the Great Plain (plain of N. China) on the west, are composed of a series of synclinal and anticlinal ridges; the synclinal basins have enormous deposits of Palæozoic and Mesozoic sediments, folded long before the Tertiary age, the anticlinal basins are formed of pre-Cambrian rocks. Coal-measures of various ages are believed to underlie these basins. (c) *The South China Block*, covering an enormous territory south of the Great Plain, seems to be of the same age, on the whole, as the Indo-Malayan Mountains Block, and in general of the same composition. Huge coal-measures occur here, and also red sandstones which have given the famous Red Basin its beautiful name (d) *The Mountains of the Far West*, bordering the Red Basin and the South China Block, are believed by many to be of Alpine or Tertiary age; but there is no consensus of opinion on this question. As it appears from this brief analysis, coal is China's foremost

mineral; estimates vary, but a conservative estimate places the total coal resources of China at about 100,000,000,000 tons¹ Iron is also abundant in China, though much less than coal. The principal deposits are in Shansi, Chihli, Shantung, and Manchuria. The annual output of iron ores is about 1,500,000 tons Copper and tin are plentiful, especially in Yunnan China produces over 60 per cent., of the world's antimony, most of which comes from Hunan Some gold, silver, lead, wolfram, molybdenum and bismuth are also found. There is oil in Shansi, but China is not known to have large resources of oil. Eastern Tibet is known to have considerable mineral wealth; but our knowledge of that country as well as of its associated basins is most rudimentary Tibet-Mongolia

For its size the geology of Japan is very complicated Japan owing chiefly to the intensity of Alpine folding and its extraordinary volcanicity, and the country is not, on the whole, rich in mineral wealth. There are small coal-fields and oil pools in the sedimentary rocks of the Tertiary age, and anthracite is also found in the Mesozoic rocks Associated with Archean and Palæozoic rocks and Tertiary volcanics are found copper, gold, silver, and iron. Copper is the most important metallic mineral, and Japan ranks fifth among the largest producers of copper. The general facts relating to the basal structure of Siberia have already been noted The country is Siberia. rich in minerals. Its coal resources are said to be a quarter of the total coal resources of Asia or a half of those of Europe. Oil, however, is far less plentiful, although there are abundant resources in Sakhalin and

¹ Stamp, *Asia*, p. 455. These figures as also much of the general material have been taken from that book. One estimate places China's coal resources at 994,987,000,000 tons against 747,508,000,000 tons for the whole of Europe.

Kamschatka Gold is very widely distributed along the principal river basins, and so is also iron. Other minerals, such as, copper, zinc, lead, and silver are especially important in the Altai region, Yenisei province, Transbaikalia, and the Maritime Territory. Tin, manganese, platinum, iridium, and osmium are also fairly plentiful, and there are also numerous non-metallic minerals all over the country.

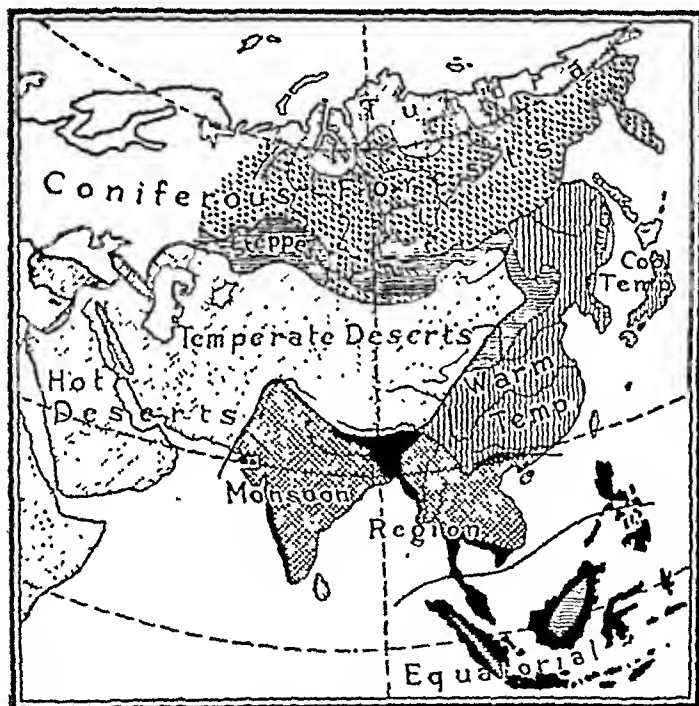
Climate.—The general nature of the climate of Asia is determined by two of its basic features; the one is its size; the other, its *central complex* of lofty plateaus and mountain chains. The interior of the continent is more than 1,500 miles from the sea,—a feature sufficient by itself to ensure extreme *continentality* of the climate.¹ This, however, is accentuated by the fact that the central tangle of plateaus and Alpine chains effectively cuts the interior off from all oceanic influences. The climates of Asia are, thus, characterized by extremes and contrasts to be found nowhere else on the earth in the same degree of completeness.

With the advent of the summer months, accompanied by a gradual shifting of the earth's thermal equator to the north of the Equator, the south and the centre of the continent become extremely hot, and a number of low-pressure centres are formed. Inflowing winds from the ocean then rush to these low-pressure centres, causing rainfall over the whole of Asia except the south-west (N. Arabia, Persia, Afghanistan and Baluchistan), which forms a continuation of the Mediterranean region of Europe and Africa. The amount of rainfall, however, is determined by topography:

¹ Meteorologically the whole of Eurasia together with the northern parts of Africa—a territory of about 25 million sq miles—is considered as a single land mass

thus the great mountain barriers of the central plateaus prevent heavy showers all over the vast interior.

In the winter months, when the earth's thermal equator Conditions in Winter. shifts to the south of the Equator, the centre and north of the continent become very cold, and a number of high-



THE NATURAL REGIONS OF ASIA

pressure centres are formed over the whole of the interior. Dry, cold winds then begin to blow out in all directions from the heart of Asia, but they are cut off in their progress towards India by the lofty Himalayas. Since these are dry

winds blowing from a vast land surface, they do not bring in rain until they have crossed the seas. Thus the whole of Asia, excepting Japan, Central and South China, the coasts of Indo-China, the Philippines and Ceylon and a few other places, is practically rainless in winter. The East Indies, however, have rainfall all the year round, owing to their situation in the Equatorial Belt. The Mediterranean continuations of Asia also receive some rain in the winter months.

Owing to the vast extent of the continent and the diversity of its orographical features, a number of climate zones can be distinguished:

1. The Equatorial Climate prevails in Malaya, nearly the whole of the East Indies, and, in a modified degree, in Ceylon.

2. The Tropical Monsoon Climate occurs in India, Indo-China, and Southern China. The rainfall in Central and Northern China and Japan is, no doubt, monsoonal, but the climate of these places is characterized by much colder winters; moreover, these regions lie outside the Tropics.

3. The Warm Temperate East Coast Climate (China Type) is found in Central and Northern China and Japan. Unlike India, China is not protected by any mountain barrier like the Himalayas from the dessicating winter winds from the heart of Asia. Three sub-types are often distinguished:

- (a) *Central China sub-type*, represented by the climatic conditions of Shanghai and Hankow.

- (b) *Northern China sub-type*, represented by those of Peiping.

- (c) *Japan sub-type*, which is modified owing to the insular position of that country.

4. The Cold Temperate East Coast Climate (Manchurian Type) prevails in Manchuria and Amuria. This is akin to the Laurentian type; but the rainfall is basically monsoonal.

5. The Hot Desert Climate (Sahara Type) prevails in Arabia and the desert regions of India. But the climate is not everywhere strictly of the Sahara type. At least two sub-types can be distinguished.

(a) *The Thar sub-type*, which occurs in the Thar Desert of India and the Lower Indus Valley, is a very dry type of monsoon climate

(b) *The Mesopotamian sub-type*, occurring in Syria, Mesopotamia, and Persia, is, likewise, a very dry type of Mediterranean climate

6. The Temperate Desert Climate prevails in the high plateaus of Central and South-eastern Asia. It is particularly in these regions that we find evidences of extreme continentality. The rainfall, which is invariably very low, is peculiar in that the eastern parts receive their scanty share of moisture mainly in summer and the western parts mainly in winter. This apparent anomaly is easily explained by the fact that these temperate deserts of Asia are bordered on the south-east by monsoon lands and by Mediterranean lands on the south-west. Four sub-types have been distinguished:

(a) *The Tibet sub-type*, prevailing over most of Tibet and reaching as far to the south-west as Leh in Kashmir.

(b) *The Iran sub-type*, prevailing in Persia and Afghanistan and characterized by rain in winter.

(c) *The Gobi sub-type*, found in north-Tibet, the Gobi Desert and the Tarim Basin.

(d) *The Turkestan sub-type*, occurring in the lowlands of south-western Siberia.

Manchuria
and Amuria.

Arabia and
Thar
Desert.

Syria,
Mesopota-
mia, and
Persia

Tibet, Iran,
Gobi, and
Turkestan.

7. **The Mediterranean Climate**, found in the coasts of Asia Minor and Syria, and, in a modified degree, along the Kurdistan Mountains. The Asiatic Mediterranean lands, however, belong to the climatic zone known as that of the 'Eastern Mediterranean sub-type', and have, therefore, colder winters than the Mediterranean lands farther west.

8. **The Temperate Continental Climate** (Temperate Grassland Climate) is found in the steppelands of Western Siberia, and, in a modified degree, in the grasslands of Mongolia. It is characterized by long and severe winters, short and warm summers, and light spring and summer rains.

9. **The Cold Temperate Climate**, is found in the northern coniferous forest region of Asia. It is characterized by low average temperature and scanty precipitation mainly in the form of snow.

10 **The Arctic Desert Climate** (Tundra Climate) is found along the northern shores of Russia. It is characterized by very long and very cold winters, but very short and hot summers.

Natural Vegetation.—The natural vegetation of the Equatorial Regions of Asia is lofty, evergreen forest. The forests are not so dense as in the Amazon or Congo Basin. The trees, especially the larger ones, are almost invariably of the hardwood species, and frequently rise to heights of 200 and 250 feet or more. Owing to the comparative openness of these forests smaller trees and ground vegetation are not wanting; bamboos, canes, grasses and other herbaceous vegetation are often found. But it is difficult to exploit these forests on a commercial scale, mainly because the taller trees commonly stand widely apart from one another. A fall in temperature due to elevation does not ordinarily affect equatorial vegetation below 5,000

feet. The natural vegetation of the monsoon regions is also forest; but the forests differ according to rainfall: where there is more than 80" of rain annually, evergreen forests of the equatorial type occur; the typical 'monsoon forests', however, are found in regions having an annual precipitation between 40" and 80"; these 'monsoon forests' are the home of the famous sal and teak woods, which, though of the hardwood species, are much more tractable than equatorial hardwoods. Since the Monsoon forests are more open than equatorial forests, bamboos and drier types of grass are more numerous. Where the precipitation is below 40" occur thorny trees like acacia. These woodlands gradually yield place to scrubland and thorny bushes as the rainfall decreases, and these latter to succulent plants of semi-desert regions. The frostline in the Monsoon regions is generally on a level of 3,000 feet, and hill forests of these regions fall into two broad classes—the evergreen forests represented by the various species of oak, and coniferous forests. The natural vegetation of East Asia seems to be of a mixed character—broad-leaved evergreen trees and conifers interspersed with bamboo, the wood-oil and the varnish trees. The Chinese, it is interesting to learn, have almost wiped out the natural vegetation from their country. In Japan there are evergreen and deciduous broad-leaved trees of the hardwood species and conifers. In Manchuria and the adjoining tracts mixed forests of conifers and hardwoods predominate. The conifers include spruce, silver fir, red pine and larch, and the hardwoods are represented by oaks, alder, ash, and beech. In the Mediterranean regions of South-Western Asia flourish evergreen woodlands of small trees represented by the olive, myrtle,

(2) Monsoon Regions.

(3) Temperate Monsoon Regions of China and Japan.

(4) Manchurian Region

(5) Mediterranean Regions

orange, vine, and some conifers of smaller species. The grassland regions of Asia comprise those of south-west Siberia, the Mongolian plateau, and the low lands of Central Manchuria. Coniferous forests predominate in the cold temperate regions of Siberia and reach as far south as the mountains of Central Asia. The typical vegetation of the Arctic Regions consists of mosses and lichens. In the more favoured areas dwarf shrubs and willows exist. This Tundra vegetation is not only confined to the Arctic wastes, but are found in the Tibetan uplands, as well. The natural vegetation of the Desert Regions' is an 'impoverished proto-type of the more fortunate adjoining tracts

Population.—Asia is easily the most populous of the continents; but the population, besides being very irregularly distributed, is much smaller relatively to its area than that of Europe; for it has a density of about 46 to the square mile as against 90 in Europe. Yet, again, the combined population of the four Asiatic countries, *viz.*, India, Java, China and Japan, which together constitute an area equal to about five-sixths of the total area of Europe, is nearly double the population of the latter continent. The rest of Asia is extremely thinly peopled. The total population of India (excluding Burma), according to the census of 1941, is about 388,800,000 with a density of about 245 to the square mile; that of China some 400,000,000 with a density of 260; that of the Japanese Empire is expected to be nearly 100,000,000 with a density of 380, and Java with a population of 41,720,000 (1930) has a density of over 817. On the other hand, the vast tract of Arabia is believed to have a population density

of 7; the enormous territories of Siberia, below 5; and much of Central Asia, under 1. The explanation of the anomaly is to be found mainly in differences of climate, and these differences are, in their turn, due to location and topography.

THE COUNTRIES OF ASIA

TURKEY

The Exit from Asia

The Republic of Turkey comprises an area of about a third of a million square miles, and a population of some 15 millions. It includes a small European territory around Istanbul and Edirne (Adrianople) as far west as the Maritsa River. Turkey is practically coincident with that indefinite territory called Asia Minor. She, however, holds a key position at the entrance to the Black Sea. Position & Extent.

The whole territory can be divided into two broad regions,—(a) *The Plateau*, and (b) *The Coastlands*. Two broad climatic belts may easily be recognized; the coastal tracts have an essentially Mediterranean climate, but that of the plateau region is more akin to the climate of the steppelands of Russia—dry and severe. The people of the plateau region are nomads, and their principal occupation is stock-raising. *Wool* and *mohair* constitute the chief products of this dreary region, and Turkey held a virtual monopoly of the fine silky mohair until surpassed by South Africa. In the heart of the plateau region lies Ankara, now the capital of the Republic. The principal products of the coastlands are the typical Mediterranean fruits such Relief
Climate & Natural Regions.
Chief products

as the *grape*, *olive*, and *fig*; *wheat*, *barley*, *tobacco* and some *cotton* are also grown; *sponge fishing* is important amongst the Aegean Islands; another important product is *opium*, especially in the west coast. There are enormous forests tracts, yielding valuable timber and other forest products such as *oak*, *pine*, *beech*, *fir*, *elm*, *linde*, *walnut*, *chestnut*, etc. Izmir (Smyrna) is the most important port and town on the west coast

Although richly endowed with mineral wealth, these for the most part lie unexploited yet, the working of metals being largely confined to the production of household utensils of brass and copper. *Carpet weaving*, however, is amongst the chief manufacturing industries and modern cotton-ginning and cotton-oilcake factories as well as salt and sugar works are steadily being established. *Silk* production and the manufacture of silk fabrics are old industries. Some *mining* is also done, but the production is small at present, although future prospects are bright. The difficulty in exploiting the mineral resources of the country has been attributed mainly to the lack of communications. The total road mileage of Turkey is some 30,000, but the road system shows a curious absence of main trunk lines, which has resulted in the isolation from the rest of the country of even such important centres as Izmir and Bursa. And the railways constitute a total mileage of some 3,000 miles only. But railway connections have now been established between Ankara and Paris *via Istanbul* on the one hand (Simplon-Orient Express—Paris to Istanbul), and between Paris and Tripoli (Syria) *via Istanbul* and Aleppo. There are two railway systems in Turkey—the one, conveniently grouped as the Anatolian-Baghdad system, runs, with all its adjuncts considered together, across the whole country from Haidar Pasa, opposite Istanbul, to Nisbin on the

Syrian border, connecting Ekichehr, Konia, Adana and Aleppo (Syria), and throwing out lines to Ankara and Kaisarie; the other, grouped as the West Coast system, establishes communications amongst Panderma, Izmir, Aidin etc. Various projects are now under consideration: thus there are projects of establishing communications between Adalia and Konia, Sivas and Kaisarie, Erzerum and Trebizond and so on

It is, however, difficult to obtain accurate figures relating to the foreign trade of the Republic, owing mainly to governmental reticence on the subject. The general trend of the trade, however, may be indicated by the following tables compiled from the incomplete statistics available.

Foreign
Trade.

The Exports of Turkey

Tobacco	..	..	28 per cent
Fruits & Vegetables	..	..	17 " "
Cotton & Cotton manufactures	..	..	12 " "
Wool & Wool manufactures	.	.	9 " "
Various	..	..	34 " "
			<hr/>

The Imports of Turkey

<i>Manufactures</i>			
Cotton goods	..	..	31 per cent
Woollens	..	..	7 " "
Metals	.	.	9 " "
Cereals	..	..	9 " "
Colonial goods	.	.	8 " "
Various	..	..	36 " "
			<hr/>

Cyprus, an island to the south of Turkey, is a British Crown Colony. Its chief products are *beans, wheat, sesame and grapes*. The small amount of export consists mainly of wine and agricultural products. The capital is Nicosia, and the chief port is Larnaka.

Agriculture.

Export.

Towns.

ARAB ASIA

Introductory.—Arab Asia is both a geographical and cultural unit. It comprises roughly the whole of south-western Asia 'lying, south of the main mountain belt of Armenia and west of the Zagros'. The predominant language over this vast territory is Arabic, and the culture essentially Semitic and more pronouncedly Islamic. Prior to the Four Years' War (1914-18) nearly the whole of it was a part of the Ottoman Empire. As a result of the post-war settlements it is now divided into the French mandated territory of Syria, the British mandated territories of Palestine and Transjordan, the kingdoms of Iraq and Arabia, and the British sphere of influence extending from Aden.

SYRIA lies south-west of Asia Minor, and readily falls into four natural divisions: (a) *The Western Coastal Plains*, formed by a succession of extremely narrow strips of land. The climate is, of course, Mediterranean, the rainfall fairly abundant, and the soil fertile. The chief products are oranges, especially in the Plains of Tripoli and Sidon (Saida), olives particularly in the Plain of Beirut, and tobacco, mainly in the Plain of Latakia. The principal towns of this region are ports of Alexandretta, Latakia, Tripoli, Beirut, and Sidon (Saida), all actually open roadsteads except Beirut which has a good semi-natural harbour. (b) *The Western Mountain Ranges*, formed by the three principal blocks of the Amanus Range (Giaour Dagh) Jebel en Nuseiriye, and Lebanon. There are occasional forests, from which the famous 'Cedars of Lebanon' are obtained. North Lebanon also yields good quality iron-ore, and there is lignite in South Lebanon. Syria

however, is poor in mineral resources. To the east of Lebanon is the Anti-Lebanon, and in between the two is the valley of the Litani river. (c) *The Great Central Depression*, actually an agglomeration of unhealthy marshes and fertile tracts of land, formed by the fertile plain of Antakia (Antioch), and the Basin of the Orontes river. The principal products are temperate cereals (wheat, barley, durrak, etc.), and temperate fruits. On the banks of rivers and near the marshes liquorice root grows wild. Another important thing extensively cultivated is the mulberry tree for the silk worms; silk production is an important industry, especially in Antakia. The principal towns of the region are Antakia, Hama, and Homs. Cotton growing has increased in recent years. (d) *The Eastern Mountain Ranges*, which gradually fade into the Syrian Desert. The whole of this region, except a few places such as the lands around Aleppo and Damascus, is climatically very dry, and subject to dessicating cold winds in winter and severe heat in summer. Large numbers of sheep and goats are kept in Syria, especially in the Aleppo district, and wool forms an important item of export. Syria is rather well served by roads and railways. There is direct railway communication between Aleppo and Tripoli *via* Hama and Homs. The Simplon-Orient Express, which runs from Paris to Istanbul is now continued, by means of connections, to Egypt through Syria and Palestine. There is broad-gauge connection between Aleppo and Tripoli and narrow-gauge (metre gauge?) trains run between Damascus and Beirut, as well as between Damascus and Haifa; the latter line runs to Egypt from Haifa (Palestine). Motor cars run from Tripoli to Acre (Palestine), *via* Beirut, Sidon, and

Products &
Trade
Centres.

Products &
Trade
Centres.

Communi-
cations.

Trade.

Tyre, as between Damascus and Beirut, and between Aleppo and Acre *via* Hama, Homs and Damascus. Cotton, raw wool, raw silk and fruits are the chief exports; textiles, cereals and iron and steel goods form the chief imports. Most of the sea-borne trade is with France, Britain, and Italy.

PALESTINE is geographically as well as historically a part of Syria, and like the latter it falls into a number of natural regions running more or less parallel to the Mediterranean: (a) *The Coastlands* on the west are very much alike in climate, fertility and products to those of Syria. This is the region of the famous Jaffa oranges. The principal towns of this region are Acre, an ancient town and port, Haifa, the chief port of Palestine, Jaffa, an open roadstead but owing to its position the central outlet of the country, the newly built Jewish town of Tel Aviv adjoining Jaffa, and Gaza, a minor port. (b) *The Hill Country* lying in the middle serves mainly as an extensive pasturage for sheep and goats. Some olive is grown in the comparatively fertile tracts. This is the region where lies Nazareth, the famous old village of Biblical antiquity, and the town of Jerusalem, the Mecca of the Christians. (c) *The Jordan Rift Valley* (El Ghor), consisting of the river Jordan, the Ganges of the Christians, the Sea of Galilee, and the Dead Sea. Naturally the region is cut off from the rain-bearing westerly winds and is therefore climatically as dry as a desert except for the waters of the Jordan. Salt is obtained from the Dead Sea, and electricity is generated from the flowing waters of the Jordan for illuminating the holy city. Roughly two-thirds of the people of Palestine are Syrians or Northern Arabs, a quarter Jews, and the remainder

Christians The British Government has been openly endeavouring since the famous **Balfour Declaration** of 1917 to establish a national home in Palestine for the Jewish people But this has engendered much friction between the Muhammedan and Jewish communities, and although the first decade since the declaration witnessed an overwhelming influx of Jews in Palestine, there has been an excess of Jewish emigrants over immigrants in subsequent years Palestine is well served by roads and railways. There is road communication between Nazareth in the north and Jerusalem (and beyond) in the south; from Nazareth one road goes as far as Tripoli (Syria) along the coast, and another to Aleppo *via* Damascus, Homs and Hama There are road communications between Haifa and Nazareth (and beyond), and between Jaffa and Jericho in the Jordan Valley (and beyond) *via* Jerusalem. Various projects for a new system of trunk roads (as between Haifa and Gaza along the coast and between Haifa and Jericho over the interior) are being considered The railway lines along the coast connect all the ports, while throwing out branch lines to all the important inland towns.

TRANSJORDANIA, east of Palestine, actually constitutes the margin of the great Desert of Arabia Its chief town, **Amman**, has motor communication with Jerusalem and Jaffa The unfinished Hejaz Railway destined to Mecca also proceeds through this town. Agriculture and pastoral pursuits form the chief occupations of the people

IRAQ bordered on the west by Syria and Arabia and on the east by Persia, falls into four natural divisions (a) *Kurdistan*, a mountainous tract on the north-east; (b) *Upper Iraq*, corresponding roughly with

People
Immigra-
tion & Emi-
gration of
Jews

Communi-
cations

Position,
Relief &
Natural
Regions.

Assyria of old and embracing a considerable portion of Mesopotamia; (c) *Lower Iraq*, extending roughly from Baghdad to the Persian Gulf, and thus embracing the greater part of Mesopotamia; and (d) *The Desert Fringe* on the west. Mesopotamia, literally meaning the land between the rivers, is the country drained by the Tigris and Euphrates. The general barrenness of Kurdistan is only occasionally relieved by good pastures and cultivable lands on the lower slopes and in the valleys. That portion of Upper Iraq which lies between the Tigris and the foothills of Kurdistan is also not fertile except for the deep broad valleys of the Tigris and its tributaries, the Great Zab and Little Zab. Upper Mesopotamia, which is included in this division, is an open, undulating plain with a few range of low hills; it, too, is not a fertile tract of land. Lower Iraq, however, is a fine fertile alluvium. The date crop is the most important agricultural product of Iraq; for 80 per cent of the world's dates are produced here. It is the staple food of the Arabs. Rice, though of poor quality, ranks second amongst the agricultural products. The largest concentrations of dates and rice as well as of maize, millets, and sesame are in Lower Iraq. Iraq specializes in the cultivation of wheat and barley, where 'dry-farming' is the general rule. Another important crop is tobacco, especially in the north. Iraq also produces opium, hemp, lentils and liquorice root, particularly in the famous Shatt-el-Arab region in the extreme south. The production of cotton, however, is meagre, but there are great possibilities for the finest types of Egyptian cotton. Large numbers of camels, horses, donkeys, sheep and goats are reared by the nomadic and semi-nomadic tribes on the desert fringes and the upland

plains of Upper Iraq. Fine wool and mohair are obtained from the sheep and the Angora goats of Kurdistan. The mineral wealth of Iraq consists of salt and some poor quality coal, but above all of oil. There are three oil-belts—the western belt runs along the Euphrates Basin, the middle belt along the Tigris Basin, and the eastern belt along the border of Iran. The eastern belt was discovered only in 1927, and since the construction of a twin pipe-line to Tripoli and Haifa in 1935 production of oil has greatly increased. Iraq is, on the whole, well served by rivers, roads, and railways. The Tigris is navigable by steam craft for more than 450 miles from above Baghdad to where it unites with the Euphrates to form the Shatt-el-Arab. Below this point, however, navigation is impossible except for very small crafts because of the loss of water in a number of distributories. The Euphrates is too much obstructed by shallows. Though there are good motor roads in Iraq, the absence of trunk lines is obvious. There is railway communication between Basra in the south with Kirkuk in the north *via* Nasiria, Hilla and Baghdad. Another railway line starts from Baghdad to Mosul through Samarra, but there is a project to discontinue this line and link Baghdad and Mosul by a new route starting from Kirkuk. The principal town of Iraq is Baghdad situated in the heart of the country. It has been a meeting place of caravan routes from Arabia, Syria and Persia for centuries on end, and is now a centre of various manufactures—silk, woollen, cotton, rugs, pottery, etc. Basra, on the Shatt-el-Arab some 60 miles from the sea (Persian Gulf), is the chief port—indeed the only port accessible by ocean-going vessels. Mosul, the third city of Iraq, is the principal town of

Communi-
cations.

Towns &
Industrial
Centres.

the north Nineveh, the capital of the ancient Kingdom of Assyria, was situated near the modern town of Mosul. Near the ruins of Babylon is another town, Hilla, situated on the river Shatt-el-Hilla. To the north-west of Hilla is the holy city of Karbala, and to the south-west of Hilla is Najaf, another holy city. Kut-al-Imāra and Kurnah 'Amāra are important wheat centres on the Tigris.

The foreign trade, as is quite usual, shows an unfavourable balance; for of the total value of this trade nearly 50 per cent is covered by imports, less than 25 per cent by exports, while transit trade accounts for the remaining 25 or 30 per cent. This transit trade is actually *entrepôt* trade, carried on mainly with Persia, and in this Iraq is in keen competition with Russia.

ARABIA is a desert tableland, climatically very dry; only the mountainous tracts of Yemen in the south-west and Oman in the south-east have a rainfall sufficient for the cultivation of the coffee plant. But the prolonged washing away of the soil has rendered coffee-culture difficult. The isolated oases in the interior, however, are suitable for the date-palm. Arabia is now divided into a number of political units such as the the kingdoms of the Hejaz, Oman, Nejd, the Imāmate of Yemen, the Egyptian dependency of Sinai, the British protectorate of Koweit, the British possession of Aden, etc. The Sultanate of Oman is bound by a treaty with the British Government, and the task of guarding the Persian Gulf has now devolved upon the British Admiralty. The Bahrein Islands are also under British protection. Riyādh, in the heart of the oases region, is the capital of Nejd. Sanā, an upland town in the interior, is the chief centre of Yemen; its port is

Hodeida. But the port of Mocha, famous for the 'Mocha coffee' is the principal outlet for Yemen. The holy cities of Mecca and Medina are in the Hejaz. Maskat (Muscat) is the capital and port of Oman. Korein (Grane) is an excellent natural harbour round the inlet of Koweit (Koast). Manama is the capital and commercial centre of the Bahrein Islands. Aden, on the south coast, a fortified coaling station and *entrepôt*, has an admirable natural harbour. Its area is 75 sq. miles, but the settlement includes the island of Perim in the Straits of Bab-el-Mandeb with a further area of 5 sq. miles, and a hinterland, forming a British Protectorate, comprising an area of 9,000 sq. miles. The trade of Arabia is small. The most important item of export is perhaps the fine Mocha coffee, but the quantity raised and exported is not much. But the quality and price of the indigenous coffee enable the Arabs to import the cheaper Brazilian or Javanese coffee for home consumption. Other items of export are gum, hides, and wool. The Bedouins carry on the breeding of camels, and sell them to the settled peoples of Arabia, Syria, Palestine and other places. Asses are also bred in large numbers, in Hejaz, Nejd, and Yemen, and are sold; for in Arabia they are scarcely less important than camels as means of transport. The famous Arab horses are also bred, especially in Nejd, but they are of much less importance than either camels or asses. Bahrein is the centre of the pearl fisheries of the Persian Gulf.

Towns & Ports

Trade

IRAN AND AFGHANISTAN

PERSIA, now officially known as IRAN, lies east of Asia Minor. It is largely made up of tablelands encircled by Alpine fold ridges. The elevation is

Position.

greater in the east. Precipitation is rather heavy in the mountainous north and west; but since it occurs mainly in winter, most of it is in the form of snow. This, however, has a salutary effect on the productivity of the land as the melting snow in spring feeds a large number of streams that can be used for irrigation. Otherwise nearly the whole of Iran would be a desert like Arabia. At present roughly the eastern half of the country may be classed as desert or semi-desert. The climate of Iran, especially of the interior, is sufficiently distinctive to be described as of the Iran type; it is there blazing hot and dry in summer and moist and intensely cold in winter. The high summer temperature enables the cultivation of the date-palm at an altitude of 3,500 feet, of rice at 4,000 feet, of cotton at 5,000 of the grape-vine at 7,500, and of wheat at 9,000. Rice, however, is grown mostly in the swampy plains bordering the Caspian Sea, and although the bulk of it is consumed at home, a small quantity is exported mainly to Russia. Wheatlands are much more uniformly distributed all over the country, and a large surplus is available for export. Another crop deserving special mention is opium, cultivated largely for export—mainly to China and Great Britain. Persian tobacco is of excellent quality, but home consumption being high, only a small surplus is exported. Persia's cotton is coarse and short-stapled; before the Four Years War, however, Russia was the leading customer of this commodity; now cotton production has declined, and Persia imports large quantities of cotton goods and yarn—the latter largely from India—for her own carpet industry. But the country is said to have a soil in Khuzistan, a portion of the Tigris lowland, suitable for American and even for Egyptian

cotton. Some barley, millets, and maize are also grown throughout the land, but no surplus is available for export. Sugar-cane can be cultivated in the region of rice, and the soil and climate of Persia are fairly suitable for beet as well; but the bulk of her sugar requirements has to be imported at present. The climate of Persia is suitable for a variety of fruits—both Mediterranean and tropical. The manufacture of wines from the vine is of some importance. Sericulture, for which Persia has always been famous, came to the verge of ruin owing to a disease in the latter part of the last century; yet it is still important in the region bordering the Caspian. The bulk of the raw silk now produced goes to France, Italy, Russia and Turkey. There are large numbers of transport animals in Persia—horses, mules, donkeys and camels, as well as sheep and goats. Much wool is produced both for export and the local manufacture of carpets and shawls. Persia is believed to be fairly rich in various minerals; but their existence is as yet mostly problematical, and even those that are positively known to exist have not been, with the only exception of oil, thoroughly exploited owing mainly to transport difficulties. The oil industry has been in the hands of the *Anglo-Iranian* (formerly *Anglo-Persian*) *Oil Co. Ltd.*, since 1909. The British Government owns a disproportionately large number of shares in the Company—to the extent of £2,000,000. And the purchase of shares was prompted by the necessity of getting oil mainly for the British Navy. A pipe-line, 145 miles long, connects the source of the oil at Maidan-i-Sulaiman with the refinery on the island of Abadan in the Persian Gulf. More than 15 per cent of the total revenue of the Government of Iran is derived from the royalties from the Company. Ever since the formation of the

Minerals.

Exploits of
Anglo-
Iranian
Oil Co.Interest of
British
Govt.

Company the business has been expanding by leaps and bounds, as it were, and it is now definitely known that at any time the total output of oil can be trebled. This oil-belt, we have seen, lies along the south-western border of Persia, and is linked with the eastern oil-belt of Irak. The Caucasian geosyline, we have noted further, spreads along the north of Persia, culminating in the Oxus Oil Belt farther east, it is, therefore widely believed that there are abundant oil resources in Northern Persia as well. In the north-west there are coal and iron, and it was proposed some-time ago to manufacture steel rails in that country. Persia is handicapped in her national economy by two major drawbacks: the country lacks man-power and modern means of communication. The whole territory is larger than the British Isles, France, Belgium, Holland, Switzerland and Germany combined, and yet the population is about 10 millions, of which some 3 millions are nomads. There are only about 230 miles of railways, some 600 miles of motor roads, 1,500 miles of gravel-surfaced roads, and 3,000 miles of unmetalled roads. Three railway systems, however, enter Persia from foreign lands: one line terminating at Duzdap in the south-eastern frontier connects it with India *via* Quetta; another line terminating at Tabriz in the north-west establishes communication with Russia *via* Julfa on the Russian frontier; another line from Basra and Damascus terminates at Khanigui on the Iranian frontier. From Tabriz and Khanigui to Tehran, the capital, there are motorable roads; but Duzdap to Tehran is an arduous journey of hundreds of miles by motor roads and caravan routes. A north-south railway, destined to connect Bandar Gaz on the Caspian Sea, Tehran, Hamadan and Mohammera near the Persian Gulf, has been under construction for some

years. Oil represents 60 to 65 p.c., of the countries exports. The chief imports are sugar, tea and textiles.

Chief Towns of Iran

Tehran	.. 360,000	Bandar Gaz	. Caspian Port
Tabriz	. 219,000	Astara	.. " "
Meshed	.. 139,000	Bandar Shapur	Persian Gulf Port
Siraz	. 119,000	Bushire	" "
Isfahan	. 100,000	Bandar Abbas	" "
Hamadan	. —		

AFGHANISTAN may be said to occupy the eastern third of the great Iranian Plateau. Except for a small strip on the north (Plain of Turkestan), the country is an agglomeration of lofty mountains and elevated plateaus. The climate is much like that of Iran—dry and sunny and subject to extremes of temperature. Much of the insufficient precipitation is in the form of snow, and this gives rise to a large number of short-lived streams in spring. Cultivation is confined to oases and the large river valleys of the Kabul and the Heri Rud. The leading crops are dates, pomegranates, and sugar cane, some wheat, barley, millet, maize, rice and a number of fruits (oranges, figs, grenadines) are also grown. There are large numbers of sheep, especially the fat-tailed sheep, said to be a native of Afghanistan. Meat, grease, wool and skins are obtained from them. Kabul, the capital, stands on the Kabul river. It is connected with Peshawar by a motor road through the famous Khyber Pass. Another motor road connects it with Bamian. Kandahar, another important city, has motor communication with the capital. Ghazni, once the centre of a large empire, lies on the motor road between Kabul and Kandahar. Herat, on the Heri Rud, is connected by a circuitous motor road with Kandahar.

Position.

Relief.

Climate.

Products.

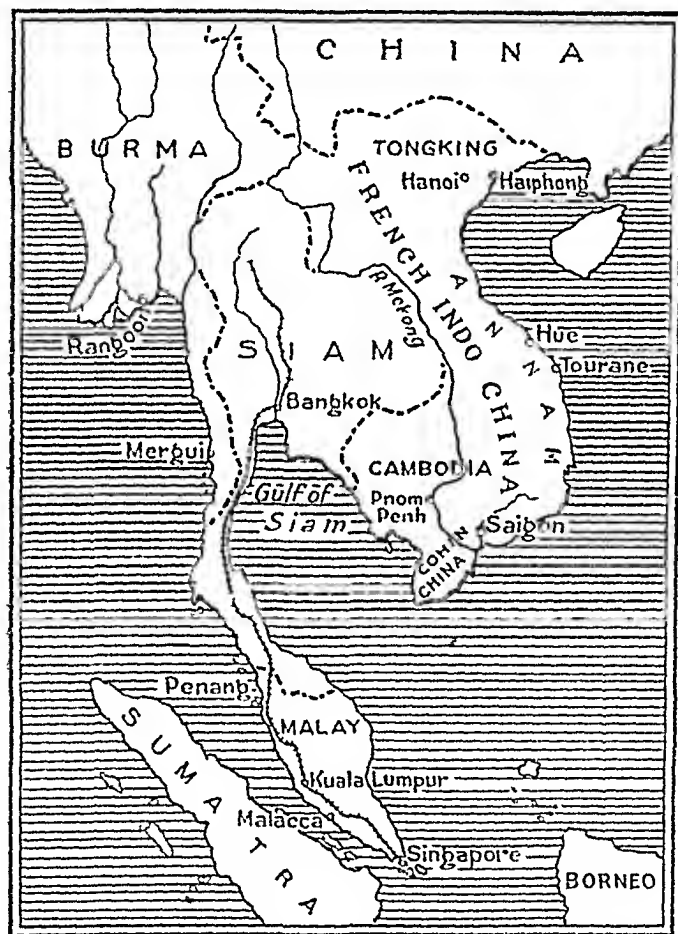
Chief towns
& communi-
cations

A railway from Merv, Russian Turkestan, terminates at the Afghan frontier north of Herat. Another line from Quetta proceeds to Chaman on the British side of the Afghan frontier some miles south-east of Kandahar. There are motor roads from Herat to the frontier between Afghanistan and Russian Turkestan, from Kandahar to Chaman, and from Kabul to Lundikhana where the railway from Peshawar terminates. Except the motor roads mentioned above goods are carried by beasts of burden like camels, asses, pack-horses and oxen. Afghanistan was once the great gateway of trade between India and Central Asia; a large part of the merchandise then passed through the Bamian Pass between the Hindukush and the Koh-i-baba west of Kabul. At present the small foreign trade of Afghanistan is mainly with India *via* Peshawar and with Russian Turkestan *via* Mazar-i-Sharif in Afghan Turkestan. Statistics are not available for the total trade; but the principal exports from India consist of cotton goods, tea, sugar, dyes, hardware and various small manufactures; exports to India consist mainly of wool, sheep-skins, wood and fruits. Imports from India alone are usually in excess of exports in value.

INDO-CHINA

Introductory.—The peninsula of Indo-China, lying as it does between India and China, is a separate geographical unit by itself. To its south, however, is the long narrow subsidiary peninsula of Malaya. But despite this geographical unity, both are now divided into a number of states between Great Britain, Thailand (Siam) and France. Under Great Britain are Burma,

the Straits Settlements and the so-called protectorates Political
of the Federated and Unfederated Malay States; Siam Divisions



or Thailand is an independent kingdom; and under

fined in Upper Burma and the Shan States, may also be mentioned here. In the south, however, particularly in Tenasserim, there are large deposits of tin and tungsten, some of which are worked by Europeans. But the most important mining industry in Burma at present is that of oil. The oilfields of the country—almost all of them—lie in the old gulf between the Arakan Yomas and the Shan Plateau; only the Arakan oil-field lies west of the Arakan Yomas. The two leading oilfields, both situated near the Irrawaddy, are those of Singu and Yenangyaung.¹ There are refineries near Rangoon, to which oil is sent by pipe-lines from these fields—at a distance of 300 miles. Burmese oil is said to be of the very best quality, and is used largely for petrol rather than for crude oil. Burma holds the second place in the British Empire as a producer of oil (after Trinidad); but its total production is said to be only about 0·6 or 0·7 per cent., of the world's total.² Further discovery of oil in Burma, however, is dismissed as highly improbable. Besides minerals, there are some pearl fisheries in the Mergui Archipelago; but the work is done spasmodically as in the case of gold.

ca- The Irrawaddy, which is navigable, for a thousand miles from its mouth, is, with its tributaries, particularly the Chindwin, the principal highway of Burma. The Irrawaddy Flotilla Company maintains regular services up and down the river; and besides other forms of river traffic, rafts are also in use for carrying timber and other bulk commodities. The railways (1,930 miles in 1930-

¹ There are eight oilfields in Burma, arranged from north to south as follows: Indaw, Nhalaingdwin, Yenangyat, Singu, Yenangyaung, Minbu, Yenamma, Padaukbin, and one, that of Arakan, in the west.

² Chisholm

31) constitute a supplementary system only. The main line runs from Rangoon to Mandalay along the Sittang Valley and thence to Myitkyina in the northern frontier; the line was till lately interrupted by the Irrawaddy at Mandalay; now a new rail and road bridge across the river has established through communication. Another line connects Rangoon and Prome along the Irrawaddy, and a third line connects Rangoon with Bassein across the Irrawaddy Delta. There is railway connection between Rangoon and Moulmein *via* Pegu across the east of the Delta as well. Burma has no railway communication with any of its neighbouring countries. Roads are conspicuously non-existent over the greater part of the country: even Rangoon and Mandalay are not connected by any motor road.

Of the total foreign trade of Burma about 96·5 per cent is seaborne. The principal items of export are rice, petroleum and petroleum products, timber, cotton, hides and skins, metals and ores, beans, rubber and lac. Rice alone constitutes about 44 per cent. of the total exports. The principal items of import are cotton goods, machinery, hardware, coal, silk and sugar. The port of Rangoon alone handles about 86 per cent., of the total foreign trade. A study of Burma's foreign trade since the opening year of the present century shows a steady increase every year with the result that the total value of the foreign trade at present is more than five times that of the foreign trade of 1901-02. The exports are more than $1\frac{1}{2}$ the imports in value. Of the total export trade more than one-third is with India, over one-third with the rest of the British Empire, and only one-quarter with other countries. Of the import trade nearly one-half is with India, about $\frac{3}{10}$ with the rest of the British Empire, and only one-fifth with other countries. Burma is still largely an undeveloped

monsoon country with great possibilities for economic development. Only 20 per cent., of the land is now under cultivation, while 18 per cent., is covered by forests (mostly 'reserved' by the government) and 22 per cent., classed as waste¹ Much of the remaining 40 per cent., may be suitable for cultivation. The country, moreover, is underpopulated, although quite capable of supporting a large population if fully developed. One of its many problems, therefore, relates to immigration from the neighbouring countries of India and China, both of which are overpopulated.

Towns of Burma

Rangoon	..	..	Capital and Chief Port
Mandalay	..	..	Irrawaddy Port.
Bassein	..	..	West Delta Port.
Akyab	..	..	Arakan Outlet
Moulmein	..	..	Tenasserim Outlet
Tavoy and Mergui	..	..	Tenasserim Outlets.

The population of Rangoon is 400,000; of Mandalay 148,000. Many of the important towns of Burma are river ports as, for instance, are Bhamo, Mandalay, Yenangyaung, Minbu, Prome, Henzada, etc

THAILAND, known for centuries as **SIAM**, is the only independent kingdom in Indo-China. It lies between Burma and French Indo-China. The country falls into four broad topographical regions: (a) *Northern Siam*, consisting of forested hill ranges and intermediate valleys arranged in a general north and south trend; (b) *Central Siam*, practically a vast single plain, bordered on the north by the hills and valleys of Northern Siam, on the east by the hill ridge of Eastern Siam, on the south by the Gulf of Siam, and on the west by the eastern mountains of Burma; (c) *Eastern Siam*, a large shallow basin encircled by hills; and (d) *Southern Siam*, occupying a rather long narrow part of the Malay Peninsula and a small strip of land

¹ Stamp, *Asia*, p 342.

between Lower Burma and the Gulf of Siam. The country is drained by numerous streams, but there is only one large river—the *Menam*—which flows through the heart of Siam. For considerable distances, however, the *Sakween* and *Mekong* form its natural as well as political boundary. Like the rest of Indo-China, Siam is also under the influence of agricultural produce, and forms about 87 per cent. of the same type as that of Burma. Teak and sappan woods are chief products of the forests; the exploitation of timber is mainly in British hands. Rice is the principal agricultural produce, and forms about 87 per cent., of the total export. Other agricultural products are pepper, tobacco, and betelnuts; some rubber and cotton are also grown, but not in large quantities, although the production of both can easily be increased. Like Burma, Siam is also rich in minerals; there are important tin deposits in Siamese Malaya and the island of Puket; wolfram is also found in Siamese Malaya. Alluvial gold is of wide distribution, but as in Burma it is worked in the intervals of agriculture. Other minerals of importance are coal, iron, zinc, manganese, and antimony. Bangkok, on the Menam, is the capital and chief port, handling, as it does about 85 per cent., of the total foreign trade. Its population is 600,000. It is connected by rail with Khorat and Buriram in Eastern Siam, and with Chieng-mai or Kiang-mai in the north. The eastern line has now been extended to the French border, and there is a scheme to extend the northern line beyond Chieng-mai to Kian-sen on the Thai frontier. Another line running south-west from Bangkok proceeds to the Malayan border, where it is joined with the Malayan railways so as to enable through trains to run between Bangkok and Singapore. Like the Irrawaddy of Burma, the Menam is navigable for a considerable distance up-

Climate & Products

Minerals.

Towns & communication

stream (for about 300 mile from its mouth), and logs from the forests are often floated down the river to Bangkok for export¹. Among the exports the overwhelming importance of rice is noteworthy. Tin and timber are the other exports. Another noteworthy feature of Thai national economy is the rapid increase in the output of rubber from the extreme south of the country (Siamese Malaya); but it is too early to predict its probable consequences. The imports are cotton goods. machinery. jute, sugar, oil, etc.

FRENCH INDO-CHINA is now divided into five units—the Colony of *Lower Cochin-China* and the Protectorates of *Cambodia, Annam, Laos, and Tonking*.

Cochin-China is roughly coincident with the large delta of Mekong. The land is very fertile; but only 41 per cent is classed as cultivated, a large part of the delta being unreclaimed marsh. Of the area cultivated more than 97 per cent is under rice, and the territory is said to supply 35 per cent., of the total rice crop of the whole of Indo-China. Other agricultural products comprise *maize, sweet potatoes, beans, sugar-cane, tobacco, coconuts, betelnuts, bananas*, etc.; small quantities of *rubber* and *cotton* are also grown. As in Siam, the production of rubber is increasing. Saigon (150,000) is the chief port; its hinterland is said to comprise all the great rice-growing countries of Cochin-China, Cambodia, Southern Laos and a large part of Annam. Cholon (200,00) is the chief industrial centre.

Cambodia is largely covered with valuable forests, little exploited yet. The soil is very fertile, but the bulk of the land lies uncultivated owing to shortage of labour. Rice, however, is the chief product. Other crops that may be men-

¹ Sometimes these are floated down the Salween to Moulmein in Burma.

tioned here are *pepper, tobacco, kapok, coffee, indigo, rubber* Products
and *cotton*. Attempts are being made to increase the output
of cotton. Pnom Penh (82,000), on the Mekong, is the
capital; it is accessible by ocean-going vessels. But the bulk Towns
of the foreign trade passes through Saigon.

The Laos is mountainous and believed to be rich in Extent &
minerals such as *gold, lead, tin, and gemstones*. The moun- population.
tains are covered with valuable teak forests, and logs are Resources
floated down the Mekong to Saigon for export.
Vientiane, on the Mekong, is the capital Capital

Annam is a native kingdom under French protec-
tion. Rice is naturally the chief product; other Extent &
products include pepper, tobacco, sugarcane, etc. But population.
a special feature of interest is the production of silk Products
and tea. The capital is Hue' (60,600), and its port
is Tourane. But the largest town of Annam is Towns
Binh-Dinh (157,000). Since the narrow coastal strip
is divided by mountain spurs into a number of separate
basins, Northern Annam is served by the port of
Haiphong. Southern Annam by Saigon, and only Central An anomaly.
Annam by its own port of Tourane.

Tongking is roughly coincident with the valleys Extent &
and delta of the Red River and its tributaries. The population.
country is mountainous. There are abundant mineral
deposits, and mining is important. Rice is naturally
the chief crop, grown mainly in the Delta region. Other Products
agricultural products are *maize, sugar-cane, arrowroot, tea,*
coffee and tobacco. Silk is also produced in large
quantities. Hanoi (100,000) is the chief town of Towns.
Tongking and capital of Indo-China. Haiphong is the
chief port; its hinterland comprises Tongking, Northern
Annam and Northern Laos.

MALAYA is a peninsula forming the south-eastern extremity of the Asiatic mainland. Geographically it may be said to cover considerable tracts of Siamese and Burmese territories. The peninsula is highly mountainous, but at the *Isthmus of Kra* there is a gap. The climate is Equatorial, but marked by transitional phases. The mountains are naturally clothed with dense lofty evergreen forests. The principal agricultural products are rubber, cocoanuts, and rice; *pepper*, *pineapples* and *palm oil* may also be mentioned. Malaya is famous for tin, but there are other minerals, too. The peninsula is divided into a number of political units: (a) The Straits Settlements, enjoying the status of a British Crown Colony, comprise Province Wellesley, the island of Penang, the territory of Malacca, and the island of Singapore, together with the Cocos or Keeling Islands, the Christmas Island and the island of Labuan. (b) The Federated Malaya States, consisting of the native Sultanates of Perak, Pahang, Selangor, and Negri Sembilan. (c) The Unfederated Malay States of Perlis, Kedah, Kelantan, Trengganu, and Johore. The native Malays belong to the Oceanic Mongol race (or races?) But the population consists of large numbers of Chinese and Indians, besides, of course, a much smaller proportion of Europeans. The Chinese are largely permanent settlers; the Indians, mostly from the Deccan, are mainly temporary immigrants, working on the rubber plantations. There is through railway communication between Singapore and Bangkok across the Johore Strait and along the more fertile western section of the peninsula; numerous branch lines cover this part of Malaya like a complicated network; another trunk line, separating out at Gemas from the Singapore-

Bangkok line, proceeds through the eastern section of the peninsula to Siam (since 1932); this line touches the port of Khota Bharu on the east coast. A new system of metalled roads, with a total mileage of 1,000, has also been constructed. There is a project for the construction of a ship canal at the Isthmus of Kra. Singapore (300,000?) is not only the Towns. headquarters of the Governor of the Straits Settlements, but the leading port of Malaya; about 75 per cent., of the foreign trade passes through it. Kuala Lumpur (80,000?), the capital of the Federated Malay States, is a large commercial centre; its port is Port Swettenham, formerly called Kuala Klang. Penang, officially called Georgetown, is the chief port for the export of tin from Perak; it has an excellent natural harbour. Malacca was once the greatest port of Malaya; but its importance has declined now, owing to the silting-up of its harbour and the rivalry of Singapore.

THE EAST INDIES OR THE MALAY ARCHIPELAGO

Introductory.—To the south-east of the Asiatic mainland there is a deep channel between the islands of Bali and Lombok, which, according to the great naturalist Wallace, separates the Asiatic and Australian flora and fauna. This the famous 'Wallace's Line.' But while Wallace's line passes through the Strait of Macassar, the channel separating the two continents diverges eastward through the Molucca Passage. It is said that if the sea-bed were elevated some 100 fathoms, the islands west of this Channel would be continuous with Asia and those east of it with Australia. The

Line of
separation
between
Asia &
Australia.

curious term, East Indies, is rather vaguely applied to the former group with the exception of those islands which belong to China and Japan. More indefinitely still, East Indies are often regarded as synonymous with the Malay Archipelago. The geological structure of these islands is very complicated, and authorities are much at variance with regard to it. Brouwer and many others believe that the main tertiary folds running down Burma, Sumatra and Java are continued in such a way as to exclude New Guinea, which, on the contrary, stands on the edge of the hypothetical Australian massif. Gregory, on the other hand, thinks that the principal tertiary folds are continued through New Guinea, which, therefore, can not be regarded as part of the Australian massif. Brouwer's is, more or less, the orthodox view; but while he would not go beyond the Sunda Islands as marking the eastern limit, on land, of these folds, many others would place that limit farther east on the Tanimbar and Kei Islands. The folds are then said to swing west in a great curve through the Buru and Ceram Islands. The whole area however naturally falls into two distinct climatic zones: (Malaya) Sumatra, Java, Borneo, Celebes, Moluccas, Timor and even New Guinea lie in the region of Equatorial Climate; and the term, Malay Archipelago, may be applied to this group only. (Indo-China) and the Philippine Islands, on the other hand, lie north of this group and have certain features in common. The term, East Indies, may be used in a wider sense to denote both the groups.

The islands are almost entirely in the hands of European and American Powers. The largest slice has been

¹ On this fascinating subject the ambitious student may be referred to H. A. Brouwer, *The Geology of the Netherlands East Indies*, and J. W. Gregory, 'The Banda Arc', *Geographical Journal*, Vol. LXII, 1923, pp. 30-32.

carved out by the Dutch, to whom belong the greater part of Borneo; the *Great Sunda Islands* of Sumatra, Java and Celebes; the whole of the *Lesser Sunda Islands* except only the north-east of Timor; the Molucca Islands; and the western half of New Guinea. To the Portuguese belong the north-east of Timor. The northern and north-western parts of Borneo are in British hands. And the Philippines were under the U. S. A.¹

Netherlands East Indies.—This economic and political unit is usually divided into two parts: (a) *Java* and *Madura*, and (b) The '*Outer Territories*'. From the commercial point of view Java, with its satellite island Madura, is the most important island in the whole group. The soil is very fertile, rainfall is moderate and there are abundant facilities for irrigation. The principal products are *rice*, *sugar*, *rubber*, *tobacco*, *coffee*, *tea*, *oil-palms*, *cinchona*, *kapok*, and *pepper*. But the cultivation of sugar-cane has recently shown a 14 per cent., decline owing to over-production in other countries and the drop in the demand from India. There is a fair output of *petroleum* from Java; and the Netherlands East Indies, we are told, enjoy a virtual world monopoly in cinchona, kapok, and pepper. Batavia, on the north-west of Java, is the capital of the whole of the Netherlands East Indies (inclusive of New Guinea); owing to the silting up of its old harbour, a new one, called *Tandjong Priok*, has been built six miles away; it has a considerable *entrepôt* trade. Samarang and Sourabaya are important roadsteads enriched by artificial harbours. Chilachap or

Extent,
Popula-
tion, &
Division.

Java &
Madura.

¹The close of the Second World War is marked by the advent of national consciousness among the people of Asia. The islands of S. E. Asia are struggling hard to free themselves from foreign domination.

Tjilatjap, in the middle of the south coast, is the only natural harbour in Java.

The 'Outer Territories', comprising the rest of the Netherlands East Indies, together have a population density of only 30 to the sq. mile. Sumatra is a large island, offering abundant facilities for development. It has a mountain backbone in the west and a progressively widening plain in the east. Large areas of the plain are however, covered by marsh. Its chief products are *coffee*, *tobacco*, *tea*, *palm-oil* and *rubber*. But Sumatra is richer than Java in minerals, especially in *coal* and *petroleum*. *Tin* is obtained in large quantities from the islands of Banka and Billiton or Belitong, off the east coast. The island is being rapidly developed; for the population of Java seems to have reached the saturation-point. Belawan Deli, Palembang and Padang, are the principal ports of Sumatra. A new harbour called *Emmahaven* has been constructed five miles away from Padang for the export of coal from the Ombilir coal-field; the harbour and the coal-field are connected by rail.

Bali, adjoining the eastern extremity of Java, and resembling that island in physical features, climate and vegetation as well as in economic development is called 'Little Java' and 'the jewel of the East.' Lombok, separated by a deep channel from Bali, has a different flora and fauna. Celebes, separated from Borneo by the Strait of Macassar, is exceptionally fertile, and has a large produce of *copra*, *spices*, and *Macassar oil* (used in cosmetics); and it is also known to have very large deposits of *iron ore*. Macassar, in the south, is the chief port of Celebes. Dutch Borneo, still very little developed, is sure to make much headway in near future as *coal* and *oil* in considerable quantities have been discovered there. The Moluccas or Spice Islands

separated from Celebes by the Sea of Celebes and linked with New Guinea by a festoon of islands, are still famous for *spices*, especially cloves and nutmegs. All these islands still bear ample testimony to the inhuman treatment the natives received in the hands of the early European adventurers, and many of the smaller islands now lie absolutely uninhabited.

British Borneo comprises three political units:

- (a) *British North Borneo*, governed by a Governor under the authority of the British North Borneo Chartered Company directed by a Court of Directors in London: (b) *Brunei*, a little British Protectorate administered by a native Sultan at the advice of a British Resident: and (c) *Sarawak*, ruled by an English Rajah since 1842, has recently been put under British rule. The chief commercial products are *rice, gums, sago, coffee, cocoanuts, pepper, spices, jelutong, timber, rubber, guttapercha, rattans, camphor*, and a tanning extract called *cutch*. Some *coal, oil, iron* and *gold* are also exported. The capital of British North Borneo is Sandakan on the north-east coast: it has a fine natural harbour. There is another fine harbour at Kudat Bay on the north. Kuching, on the Sarawak River about 23 miles from the sea, is the capital and chief port of Sarawak. Miri is the headquarters of the Sarawak Oilfields. Ltd.

Extent & Divisions.

The Republic of the Philippines, together with the Sulu Archipelago and the island of Palawan, were purchased by the U. S. A. from Spain in 1898. In 1935 they were constituted as a Commonwealth and in 1946 they have been granted full independence.

Position.

The Philippine Islands cover an area in the western Pacific a little smaller than the British Isles—4,000 square miles. Although they comprise

more than 7,000 islands, only 2,773 have names and only 462 have an area of one square mile or more. The northernmost island is 65 miles from Formosa and the southernmost 30 miles from Borneo. By occupying these islands the Japanese attempted to set up a defensive wall protecting the whole east coast of Asia.

The Philippines are mountainous and in the larger islands the ranges, volcanic in origin, are continuous and reach a height of 10,000 feet. Large rivers are few, small streams many.

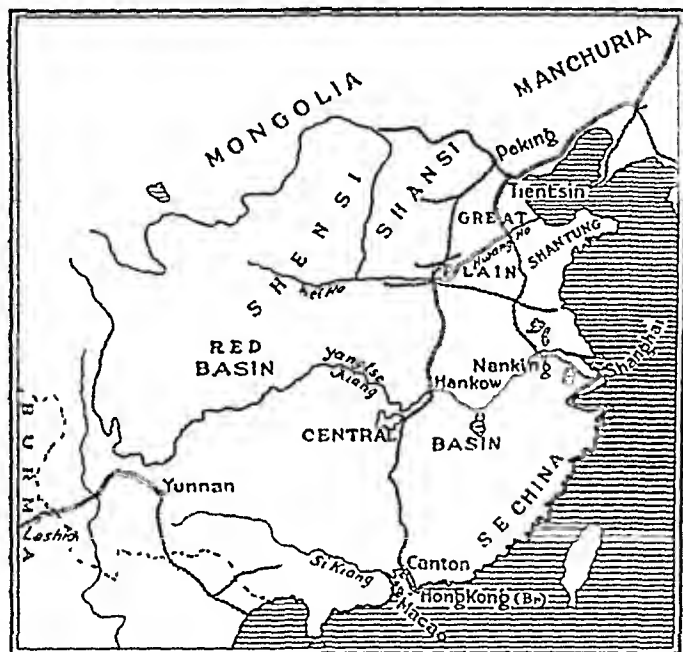
The 1939 census gave the population of the Philippines as 16 million, with Filipinos numbering 15,800,000. Of the foreign population the Chinese led with 117,000. There are 43 ethnographic groups, speaking 87 languages and dialects.

The Philippines are primarily agricultural, though little more than 12 per cent of their area, half of which is wooded, is cultivated. Eighty per cent, of the population depend on agriculture for their livelihood. The islands before the war ranked fifth in the world's sugar production, have one of the world's great stores of timber and enjoy virtually a world monopoly of hemp. The chief commercial products are *sugar, copra, tobacco, cigars, coconut oil, and Manila hemp*. Some minerals are found, notably *gold*. Manila is the capital and chief port. The bulk of the trade—roughly 70 per cent—is naturally with the U. S. A.

THE FAR EAST

CHINA proper, excluding Manchuria and the Outer Territories, has a total area of 1,532,800 sq. miles, *i.e.*, almost the same as that of India exclusive of Burma (1,542,600 sq. miles). But 'Greater China', which com-

prises Manchuria, Mongolia, Sinkiang or Chinese Turkestan, and Tibet, has the enormous extent of 4,278,352 sq. miles. Viewed broadly, China proper lies to the east of the central mountainous triangle of Asia. Part of the Mongolian Relief.



A GENERAL MAP OF CHINA

Plateau penetrates the Chinese country in the north-west. and in the south-east lies the Plateau of Yunnan. The remainder of China proper consists almost entirely of the three great river basins—those of the Hwang-ho, the Yangtze-Kiang, and the Si-Kiang, corresponding in order roughly with North China, Central China, and South China.

North China *wheat* is dominant. Millets are grown in the drier regions, especially in the north-east; but *soya-beans* are steadily invading the areas under millets. The bulk of the *cotton* is grown in the central and northern parts; but Chinese cotton is of poor quality. *Sugar* is grown in the south, and *maize*, *peas* and *beans* in the north. Tea is grown on the southern and western hills. Besides a large variety of *vegetables*, another important plant largely cultivated is the *mulberry* tree for feeding the silk-worms. Stock-raising is also widely practised. There are numerous *pigs* in China, and fat pork is said to constitute a favourite food-stuff. *Sheep* are also reared, primarily for wool; but *Chinese* wool is said to be of inferior quality. *Cattle* are used in ploughing as in India and also as draught animals, besides *horses* and *mules*. *Poultry* are important; for eggs form one of the chief items of export. China is the largest producer of silk; but in the export business her share is relatively very small. The country is distinctly backward, much like India, in manufacture, and that may be a reason for the overwhelming pressure of population on land. The dying and dead village industries of both China and India are a strong evidence of the exploitation of these countries by the great industrial nations of the West. As in India, hand looms are still to be found in most of the rural areas of China. In some of the cities such as Canton and Shanghai, cotton, wool and silk mills have been established. A large number of the Shanghai mills are owned by the Japanese. Flour mills are also increasing. And there are the large ironworks at Han-yang, near Hankow. China, we have already noted, is rich in various minerals, especially in coal, much of which is of excellent quality. In North China there are a number of small coalfields in the neighbourhood of Peiping, and a fairly big one to the north-east of Tientsin.

In the west of the mountains of Shantung are large deposits of both bituminous and anthracite coal. Towards the interior of the country there are enormous coal measures—both anthracite and bituminous—in the southern portions of the province of Shansi, the anthracite alone covering an area of some 13,500 sq. miles, and it is believed that this field alone contains 80 per cent of the total coal reserves of China. There are smaller fields in south-eastern Hunan, eastern Szechwan and northern Yunnan. Iron is found in several places, particularly in Hopei, Shansi, and Szechwan. The ores of Shansi are said to be of very good quality. But the largest deposits of iron are in Manchuria, which is now partially exploited. There are large deposits of copper in Yunnan. Silver and tin are also found in Yunnan. Hunan is noted for antimony, of which China was for some time the leading producer. Large quantities of wolfram are also obtained from China. Much of China's mineral resources still lie untouched or little exploited, and the reason ordinarily adduced for it, is the want of adequate means of communication. The Great Plain of China, which has much in common with the Great Plain of Hindoostan, affords, however, excellent facilities for communication. An admirable canal, 700 miles long, constructed in the seventh century A D, starts from Hangchow, and, after crossing both the Yangtze-Kiang and the Hwang-ho, terminates at Tientsin, thus establishing communication nearly throughout the whole of the Plain. The numerous rivers, large and small, such as the Yangtze-Kiang, even the Hwang-ho, the Pei-ho, the Meiling Pass and their numerous feeders, serve, more or less, as supplementary waterways over the Great Plain. But communication is difficult between the east and the west of China. Of the three great rivers—the Hwang-ho, Yangtze-Kiang and Si-Kiang—only the Yangtze-Kiang may be

described as an admirable water-course, being navigable for more than 1,000 miles from its mouth by ordinary steamers and for 680 miles up, *i.e.*, as far inland as Hankow, by ocean-going vessels. Between Ichang and Chungking commodities are exchanged by means of small craft. Railway lines now link Hangchow and Shanghai with Tientsin and Peiping, Hankow with Tientsin and Peiping, and Peiping with Moukden, Vladivostok and Harbin. Another line starts from Peiping and terminates at Paotao in Inner Mongolia *via* Kalgan. Hongkong is now connected by rail with Hankow *via* Canton, and this, as noted elsewhere, has now made it possible to travel by rail from 'Calais to Canton' as the phrase is commonly used. Regular air services now link up several cities of China. The foreign trade of China, like that of India, is nearly all sea-borne, and it passes through the so-called 'treaty-ports.' A 'treaty-port' is a place where foreign merchants have acquired land and property (mostly by force), and the Government of China have been compelled to surrender their own rights, and agree (by means of highly unequal treaties) to respect the rights thus acquired by the foreigners and allow them to transact business as they choose. At the present time more than forty ports are thus open to foreign vessels. Not all of them are seaports; for most of the important river ports are also at the disposal of foreigners now. The most important of these seaports are Shanghai, Hangchow, Ningpo, Wenchow, Foochow, Amoy, Swatow, and Canton; these are located on the east coast between the Yangtze-Kiang and the Si-Kiang. Shanghai is by far the most important seaport of China. The chief Yangtze ports are Chinkiang, Nanking, Kiukiang, Hankow, Ichang, and Chungking; Peiping was the old capital of the Chinese Empire; its port is Taku, a treaty-

port. Tientsin, on the Pei-ho, is the inland port of Peiping; it, too, is a treaty-port. The bulk of the foreign trade, however, passes through the three ports—Shanghai, Canton, and Tientsin. It is an open secret now that China, with her vast potential resources and 400 million people, offers immeasurable possibilities as a market for the capitalist industrial countries. And to this may largely be attributed the present political unrest in China. "It was to the advantage of the nations of Western Europe and of North America to realise," writes Stamp, "that China must be encouraged to standardise her own affairs and to appreciate the higher standard of living which will encourage her demands. But Japan saw this first and her military dictators took matters in their own hands."

HONG KONG has been in British hands since 1841, and is in control of a large part of the trade passing through the south of China. With the improvement of conditions in China its importance is likely to wane. Victoria is the chief town.

Macao, at the mouth of the Canton River, is a decaying town under Portugal.

MANCHURIA was formerly an independent state sponsored by Japan, under the title of Manchukuo. Physically, Manchuria consists of three parts. There is a *great central plain*, narrow in the south, drained by the *Relief*. river Liao; broad in the north drained by the river Sungari, a tributary of the Amur. There are two mountain ranges running north and south—the Khingan Mountains in the west and a continuation of the Korean Highlands in the south-east. The climate is similar to the Laurentian type *Climate and* (Chap.—III). The rainfall is monsoonal but the country *vegetation*.

has extremes of temperature. The mountainous borders are forested, with the thickest forests and the best timber on the eastern mountains. The most valuable timber is the Manchurian pine. The plains exhibit close resemblances to the Canadian prairies in relief and climate. Agriculture is rapidly developing here. The chief cultivated products are *millet, wheat, soya beans and rice*. Minor crops are *barley, cotton, tobacco and sugar-beet*. There are possibilities of the development of the cultivation of *cotton*. *Coal and iron ore* are the important mineral products of Manchuria. The principal coal-field is at Fushun, 22 miles south-east of Moukden. *Gold* is worked by native methods in several places but the output is not great. The progress in manufactures is slow and is most marked in the Liaotung peninsula and in the zone of the South Manchuria Railway. Extraction of oil from soya beans, cotton manufacturing, iron smelting, and silk reeling are the chief industries. The railways have played a remarkable part in the development of Manchuria. The three chief systems are—(a) the Chinese Eastern in the North, (b) the South Manchuria in the south-east and (c) the Peking-Moukden in the south-west. The chief exports are soya beans, bean cake and oil, coal, timber, sorghum, etc., and the chief imports are cotton piece-goods, wheat, flour, machinery and other manufactures.

MONGOLIA is a plateau, west of Manchuria, comprising a total area of 1,367,953 sq. miles, and surrounds the deserts of Gobi. It is inhabited by nomadic Mongols. A considerable part of it, called 'Outer Mongolia' has been under the suzerainty of Russia since 1924, and a part of 'Inner Mongolia' now forms part of the state of Manchukuo. Maimachin, on the Russian frontier, is the chief town.

SIN-KIANG, known also as Chinese or Eastern Turkestan, has an area of 550,579 sq. miles, and occupies

the Tarim Basin. It is also a plateau with a desert in the interior; but intensive cultivation is practised in the oases. Kashgar and Yarkand are the leading towns; caravan trade across the Pamirs as well as with China is carried on.

TIBET, an agglomeration of lofty tablelands, has a total area of 463,320 sq miles. Lhasa is the capital, and Shigatse and Gyangtse are the outposts for trade with India.

JAPAN

JAPAN proper, or NIPPON as it is called, consists mainly of the four islands—Honshu (or Mainland), Kyushu, Shikoku, and Hokkaido, with a total area of 149,000 sq. miles and a population (in 1930) of 64,500,000. By the term, Old Japan, is however meant the first three islands mentioned above. The total extent of her overseas possessions before the 2nd World War was only 112,000 sq. miles, and they consisted of the southern half of the Sakhalin Island, called Karafuto, the Peninsula of Korea or Chosen, the island of Formosa or Taiwan, besides the leased territory around the port of Dairen and a large number of mandated islands in the Pacific. The position of Japan is, in many respects, analogous to that of Great Britain; for while Britain lies to the west of Europe (or Eurasia) and thus commands the entrance to the Atlantic Ocean, Japan—often called the 'Britain of the East'—lies to the east of Asia (or Eurasia) and guards the entrance to the Pacific. But she is nearer the Equator than the British Isles. The surface of Japan is extremely mountainous, and the arrangement of the mountains

Extent &
Population.

Position.

Relief.

seems to be very irregular; but the main mountain-chains, forming two parallel arcs, run along the entire length



A GENERAL MAP OF JAPAN

of the country—the one along the east coast, the other along the west coast. The mountains are, no doubt, interspersed with lowlands and valleys, none of any considerable extent, and even these lowlands are often traversed by mountains

of volcanic origin. Only 20 per cent of the entire area is available for cultivation and settlement. In climate, too, there is at least a superficial analogy between Japan and the British Isles; for while the British Isles have a 'west-coast' climate and enjoy the warming influence of the North Atlantic Drift, Japan has an 'east-coast' climate, and is under the warming influence of the Kuru Siwo. But while rainfall in the British Isles is determined by the pleasant westerly winds, that of Japan is mainly determined by the summer monsoon, and in winter she is at the tender mercies of the cold dessicating winds from the heart of Asia. These winter winds, after crossing the sea, bring heavy precipitation in the form of snow to the western coasts and mountains of Japan. The eastern parts are usually dry in the cold season. Rainfall in summer is rather heavy in the south and east, but light in the west. Summer temperatures are rather high throughout the country, and more so in the south; but in winter it is often bitterly cold. Just as the warm Kuru Siwo on reaching Japan from the south divides into two currents, so also a cold current coming from the opposite direction divides into two on reaching the northern shores. The western branch of the Kuru Siwo flows close to the shore and thus mitigates the severity of the winter winds, but the eastern branch flows at a distance from the shore. The eastern branch of the cold current, however, flows between the shore and the eastern branch of the Kuru Siwo and thus keeps that shore relatively cold. The natural vegetation of Japan is forest; conifers and cold temperate forests predominate in the north, temperate forests in central Japan, and sub-tropical forests in the south. *Rice* is by far the most important food crop, and occupies even more than half (or, actually 40 per cent?) the total area under tillage. Other important grains are *rye*, *wheat*, and

Natural
vegetation.

barley. The *soya bean* has also been introduced in recent years. *Tea* is certainly important, but nearly all of it is green tea and there has been for the last few years a steady decrease in acreage under it. The production of *silk* is very important. Japan, owing chiefly to her lack of pasturage, is not an important stock-raising country; but her fisheries are extremely important. Japan is rather poor in minerals. Unlike those of Britain, her resources in coal and iron are small, and hence she lacks the essential basis of modern industry. Her present average output of coal is about 30 million tons a year. But the coal-seams are often highly disturbed, owing, no doubt, to frequent seismic disturbances.¹ The principal coalfields are in Kyushu and Hokkaido, containing, as they are believed to do, about 66 and 17 per cent., respectively of the total coal reserves of the country. There is a small coalfield in Honshu. But despite a small and decreasing export mainly of bunker coal, she has got to import a considerable amount every year. The mountainous nature of the country has encouraged the Japanese to make use of hydro-electric power largely as a substitute for coal. The development of water power is notable; in 1905, it was 12,215 h.p., in 1924 it rose to 1,750,000 h.p. More development took place from that period. At the present time Japan ranks fourth in this respect in the world. Japan is also now self-sufficient in the manufacture of electrical machinery. The principal oilfields are on the north-west coast; but the total output is only about 30 per cent of her actual requirements, and large quantities of oil are, therefore, imported—chiefly from California, the Netherland's East Indies and Mexico. The only iron mine of any importance is Kamaishi, and Japan depends mainly upon China

¹ Japan, we are told, experiences no less than 1,500 shocks a year on the average.

for the raw materials of her steel industry. Some gold and silver are also found, but the output of both is insufficient for her own requirements. Gold and silver mostly occur together, and Saganoseki is the chief centre. It is only in copper that she holds an important—actually the fifth—place (p. 180). The ores are widely distributed, and the principal mines are Ashio, Besshi, Kosaki, Hitachi, and Saganoseki. Other important minerals include *lead, tin, sulphur*, etc., and there are large deposits of kaolin. The industrial revolution in Japan had begun in 1868 or thereabouts, but it was not till the Sino-Jap War of 1894-95 was over that Japan began to make rapid strides in modern manufacture. Modern Japan may thus be said to be a creation of the last six decades or so. The most amazing developments have been made in the cotton-spinning industry. It is all the more remarkable, as Japan has had to depend upon foreign supplies of raw materials and machinery. The cotton comes from India, U. S. A., China and Egypt. The chief centres of this industry are Osaka, Nagoya, Kobe, Wakayama and Mie.

Manufacture

Cotton
industry.

In respect of silk manufacture Japan occupies a very important place. The silk industry is able to obtain ample supplies of raw material at home and the products face less keen competition in the world market. *It is the principal silk-exporting country in the world.* Much attention has lately been given to the rapid expansion of the *Rayon* or artificial silk industry. It has become one of the most important industries of Japan. Wool is imported from Australia and China to be turned into the finished products at Osaka and other centres. This industry has to depend entirely upon imported raw materials. Ship building is carried on at Nagasaki and Kobe, and iron and steel work

Silk.

at Wakamatsu. Machineries, matches, metal wares, umbrellas, toys and a great variety of articles are other important manufactured products. The iron and steel industry is not an industry of major importance in Japan, but because of its vital importance in the industrial system and in many schemes of national defence the methods that have been used to westernise it deserve special consideration. To no other industry has the Japanese government given so much assistance and in no other industry has the assistance produced such meagre results. The Iron and Steel industries of Japan suffer from two great disadvantages—(1) lack of iron-ore, (2) lack of coal. This industry has to depend on Manchuria, China and India for materials. To-day, rubber industry is of much importance; so also is match industry. In paper-making and chemicals, the Japanese are progressing well. The chemical industry is a flourishing industry. Toy-making, porcelain wares and enamel wares making, manufacture of matting, etc., are the important cottage industries of Japan.

The progress of the Japanese industrialisation depends very largely upon the country's ability to expand foreign trade. Japan is very poor in raw-materials, and has little besides her labour on which to build her industrial system. The rate of increase of population in Japan from the Sixties and Seventies of last century has been alarmingly high and within the last few years it became serious. Japan has not enough food to feed this increasing population. Mr. J. E. Orchard points out that "pressure of the population on subsistence is the basis of the present economic unrest within the country. Search for relief is the keynote of Japan's domestic and foreign politics."¹ Japan tried to

¹ J. E. Orchard—"The pressure of population in Japan, *Geog. Review* Vol. XVIII, July 1928 (Quoted from Stamp's *Asia*)"

solve the problem by becoming "the England of Asia" making "every effort for the encouragement of industrialisation and distributing her manufactured goods to all the markets of the world in exchange for food-stuffs and raw materials." Japan also tried to colonise in Manchuria and the islands of S. E. Asia, but emigration did not supply a solution to the population problem of the country. Japan tried in the past decade to secure the economic control of the neighbouring areas to solve her food and market problem. The first objective was Manchuria. After making her position quite secure in Manchuria Japan invaded China in 1937 and succeeded temporarily in establishing herself over the greater part of that country. In the beginning of the last world war she captured the whole of S. E. Asia. But her defeat has dealt a death blow to her territorial ambition.

The bulk of the foreign trade of Japan passes through the three leading ports, Yokohama, Kobe, and Osaka.

Tokyo is the capital of Japan; its chief port is Yokohama, and Yokosuka, twelve miles south of Yokohama, is the government dockyard. Osaka is the 'Manchester of Japan'—its chief seat of the cotton-spinning industry; Kobe, the great silk centre of Japan, may be regarded as the chief port of Osaka as well. Nagoya is the chief centre of porcelain and allied industries. Kyoto is the old capital. Hakodate is the port of shipment for coal from Hokkaido. Otaru is the chief port of Hokkaido. Kushiro is the lumber port of Hokkaido. Moji, and Shimonoseki are also notable ports.

The Exports of Japan

Commodities.	Percentage of Total Value		
	1909-13	1921-25	1931-35
<i>Raw materials &c.</i> ..	45	41	37
Silk	40	39	30
Coal	5	2	—
Rayon	—	—	5
Canned goods	—	—	2
<i>Manufactures</i>	34	32	42
Cotton goods	18	23	31
Silk goods	10	7	7
Copper	6	—	—
Pottery	—	2	2
Machinery	—	—	2
<i>Various</i>	21	27	21

The Imports of Japan

Commodities	Percentage of Total Value		
	1909-13	1921-25	1931-35
<i>Foodstuffs</i>	15	12	5
Rice	6	2	—
Sugar	5	3	—
Wheat & flour	2	2	2
Beans,	2	2	3
Other foods	—	3	—
<i>Raw materials</i>	50	43	53
Cotton	40	30	37
Oil cake	7	5	2
Wool	3	4	8
Wood	—	4	2
Coal	—	—	2
Pulp	—	—	2
<i>Manufactures</i>	16	23	13
Cotton goods	2	—	—
Iron goods	3	6	6
Machinery	4	6	4
Wollens	4	4	3
Oil & Petrol	3	—	—
Paper	—	2	—
Chemicals	—	5	—
<i>Various</i>	19	22	29

HOKKAIDO lies north of 'Old Japan', and is inhabited mainly by the aboriginal Ainu. The climate is severe in winter, the island being more exposed to the bitter winds from the heart of Asia. In summer, however, it is warm enough for *rice*; but *peas* and *beans* are the principal crops; some *oats*, *barley*, *maize*, *buckwheat*, *millet*, and *potatoes* are grown. About 25 per cent of the land is said to be suitable for cultivation. *Mining* and *fishing* are important; the mining is done mainly by the Japanese. The island, however, does not offer suitable facilities for Japanese emigration. *Forests* are also important, and *stock-raising* is, relatively speaking, more extensive than in old Japan.

KARAFUTO, farther north, is the southern half of the island of Sakhalin. The northern half is under Russia. The climate is even worse than that of Hokkaido, and there can be no question of Japanese emigration there. Only about 0·7 p.c. of the land is suitable for cultivation. *Fishing* and *forestry* are important; and there is some *coal*; but the *oil* resources of the island are within the Russian boundary. Products

KOREA, or Chosen, as the Japanese call it, is a mountainous peninsula to the west of Old Japan. It was formerly a dependency of Japan. The climate is, broadly speaking, like that of North China, and there are wide stretches of arable land. The principal products are *rice*, *beans*, *wheat*, *barley* and *oats*. The production of *cotton* has also increased, and *flax* has also been introduced. *Gold* and *coal* are also mined. Seoul is the capital, and Fusan the principal port. Other ports are Wiju, Chemulpho, Pingyang, and Wousan. The principal exports are *rice* (47 p.c.), *beans* (9 p.c.), *fish* (5 p.c.), *raw cotton* (3 p.c.), *won* (2·5 p.c.), and *timber* (2·5 p.c.); about 92 per cent of the total export trade is with Japan, 7 p.c., with China, and only 1 p.c., with other countries. The principal imports are Climate & Products
Ports.
Foreign Trade.

cotton manufactures (13 p.c.), *machinery* (2 p.c.), *grass cloth* (2 p.c.), *paper* (2 p.c.), *timber* (4 p.c.), *coal* (3 p.c.), *kerosene oil* (2 p.c.), and *sugar* (1.5 p.c.); about 66 per cent of the total imports come from Japan, 25 p.c., from China, 4 p.c., from the U.S.A., 2.5 p.c., from Great Britain, and the rest from other countries

FORMOSA, or Taiwan, lies to the south-west of Japan. The Tropic of Cancer cuts the island into two halves, and the climate, in some respects, resembles that of Central China, and in other respects that of South China. It, too, was formerly a Chinese province, and the inhabitants are still mainly Chinese. But there are a number of primitive races in the east, which is a mountainous tract of land. Some Japanese have, however, settled in the island. The island is rich in minerals such as *coal*, *gold*, *copper*, *petroleum*, *sulphur*, *phosphorus* etc, and the mining is naturally in Japanese hands; there is also a large surplus of *rice* for export to Japan; *camphor* trees abound, and it is from here that Japan obtains the bulk of her output of camphor and camphor oil; such tropical crops as the *sugarcane*, which it is nearly impossible to grow in Japan, can be grown here; *jute* and *China grass* have also been introduced; and Formosa *tea* is famous for its delicate flavour. Keelung and Takao are the chief ports, now provided with good artificial harbours. The chief exports are *cereals* (20 p.c.) and *other foodstuffs* (43 p.c.), *chemicals* and *drugs* (6 p.c.), *minerals* (5 p.c.), and *yarn* (2 p.c.); about 83 per cent of the export business is with Japan, 8 p.c. with China, 3 p.c. with the U. S. A., 2 p.c. with Hong Kong, and 1.5 p.c. with the Netherlands East Indies. The chief imports are *oil-cake*, *wood*, *petroleum*, *opium*, and *manufactured goods*; nearly 68 p.c. of the total imports are from Japan, 16 p.c., from China, 3 p.c., from the Netherlands, East Indies, and about 2.5 p.c., from Great Britain.

The South Sea Islands of Japan.—Japan governed a large number of islands in the Pacific, which were formerly under Germany, in exercise of her mandatory powers. The chief products obtained from these islands are *copra* and *sugar-cane*, and some *phosphate*.

SOVIET ASIA

Soviet Asia forms the great land mass lying east of the Urals and the Caspian Sea and contains the entire Arctic Coast line of Asia from the Kara sea to the Behring Strait. It also stretches deep into the heart of the continent of Asia to the boundaries of Iran, Afganistan and China and overlooks India. It is only a part of the economic and political unit known as the Union of the Socialist Soviet Republics. (Chapter IV).

STUDIES AND QUESTIONS

1. Estimate and locate the mineral wealth of China
(C. U. B. Com. '34, Inter '42, '44).

2. What in your opinion, are the causes which have made China backward in the matter of industrial development inspite of having mineral resources, cheap labour etc.? Discuss fully
(C. U. Inter '36).

3. Estimate and locate the mineral wealth of Japan.
(C U B Com '32)

4. Give an account of (a) the natural resources and (b) the climatic conditions of Japan and show how they have affected her development.
(C. U. Inter '33, '45)

5. What are the principal industries of Japan? Where are they situated? State the sources of supply of raw materials
(C U. Inter. '36).

6. Of late Japan is forging ahead in the matter of industrial development. How has this been possible for her and what are the present chief industries of Japan? (C.U. Inter. '38).

7. Give a geographical description of Java mentioning her principal exports. (C.U. Inter. '32).

8. State the importance of Dutch East Indies in the world economy. To what extent is that region a competitor to India? Is there any possibility of increasing the trade between the two countries? If so, in what direction? (C. U. B. Com '41).

9. Describe briefly the development in the transport system in the Middle East. (C U. B. Com '34).

10. Give a reasoned geographical account of the Phillipines and the Malaya Peninsula. (I. I. B. '41).

CHAPTER VI

INDIA

The Sub-continent

Introductory.—India is a sub-continent with a total area of 1,623,600 square miles (including 584 Native States Area.



INDIA—SHOWING THE PRINCIPAL PROVINCES AND STATES

covering an area of 712,508 sq. miles)—almost the same size as that of China, perhaps the only other true sub-

continent on the face of the earth. But she is a sub-continent not for her size; for there are many countries in the world with far vaster areas than India can ever boast of. True, the country is full of contrasts both in physical features and in climate, and she is also a vast ethnological museum. But there are several countries in other parts of the world with as varied—or nearly as varied—characteristics, and yet none of them, except only China, can be regarded as a true sub-continent. We are so prone to take the word 'sub-continent' lightly or as a mere poetical metaphor that even to us, sons of the soil, the true geographical nature of our mother country remains obscure. But it was no sealed book to our forefathers. With their keen perception they could readily grasp the geographical nature of the mother country, and called her '*Bhārata-barsha*,' which meant (for it can scarcely be said to mean to us to-day) the 'Sub-continent of Bharata', the term '*barsha*' meaning precisely the same thing as is indicated by the word 'sub-continent.' Like the words 'continent,' 'country,' 'peninsula', etc., sub-continent also denotes a definite geographical conception. A region which resembles a continent in its varied features but at the the same time exhibits a synthesis of them like a country is called a '*barsha*' or 'sub-continent.' It is no mere poetical expression for the vastness and varied features of a region; It is a definite geographical term. Even a casual glance at a physical map of India will convince us of the fact that "there is no part of the world better marked off by nature as a region by itself It is a region indeed full of contrast in physical features and in climate, but the features that divide it as a whole from surrounding regions are too clear to be overlooked."¹ These physical contrasts, however,

¹ Chisholm.

are fully reciprocated in the varied characteristics of India's vast population. Every provincial race resembles a distinct nation in India as do the various nationalities of a continent. The inhabitants of different provinces have different traditions, languages, manners and customs. But these sharp regional differences do not obscure its oneness. India presents a picture of cultural unity in the midst of physical diversity. All the provincial races draw from the common reservoir of tradition and culture and therein do they exhibit the common characteristics of the great Indian nation. The type of national unity manifest in the common tradition, culture and history of a nation to be found in the national characteristics of the Englishman or the Frenchman, for instance, is by no means lacking in India. Each of our provincial races is comparable in respect of national consciousness, tradition, history, culture, language—in fact in all the factors that go to constitute a distinct nationality—with the nations of different countries like England, France, the U. S. A., etc. To overlook these points is to misread and misinterpret India and the Indian nation altogether.

The
Indian
nation.

Environmental Setting.—India is the largest of the three peninsulas which occupy the southern part of the continent of Asia, and is a wedge of land projecting southwards from the main mass of the Asiatic continent and is separated from it by the most impassable mountain barriers in the world. There are the lofty Himalayas and Karakoram ranges guarding the northern frontiers; on the north-west are the Sulaiman and Khirthar mountains. Then there are the *western deserts* and the *eastern* mountain chains and valleys which offer only a few openings. Elsewhere she is bounded by the Indian Ocean, the Arabian Sea and the Bay of Bengal.

Mountain
rampart.

important agricultural products. The beauty of the snow-clad peaks and the lure of the unknown attract tourists and mountaineers from all parts of the world.

The North-West Ranges constitute a frontier land, inhabited by poor pastoral tribes. It is an extremely dry region. Wheat, millet and barley are grown in the river valleys with the help of irrigation. Sheep and cattle are reared.

The Indo-Gangetic Plain lies between the peninsula and the Himalayas and stretches almost without break from Baluchistan to the borders of Burma. Three great river systems water it, two of which, those of the *Indus* and the *Brahmaputra* originate in the great Central Asian plateau behind the Himalayas while the third the *Ganges* collects most of the drainage of their southern slopes. The larger part of this immense plain covering an area of about 300,000 sq. miles, is alluvial. "The aspect of the region varies from the arid sunbaked plains of the Punjab to the reeking forests of Assam and the swamps of the Gangetic delta, but the general effect is that of *flatness* unbroken except where there is sudden drop from the upland plain to the lower level near the streams"¹ Favourable climate and fertile soil have made this region the *richest* and the *most populous* part of India. The rivers of this region are perennial and lend themselves admirably for irrigation purposes. Agriculture is the most important occupation here. Wheat, barley, maize, rice, sugar-cane, jute, cotton, tea, oil-seeds etc., are the important products. Important minerals like coal, oil, iron, mica, manganese occur here and this has given rise to many important manufacturing industries.

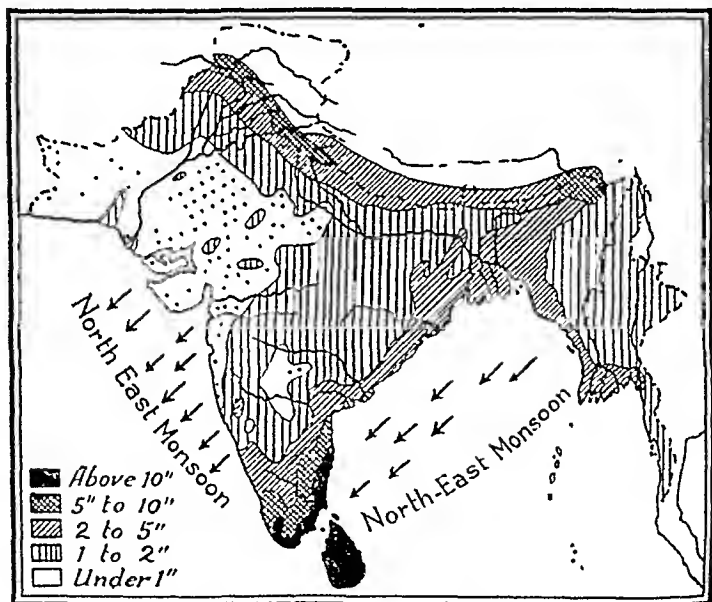
¹ The Oxford Survey of the British Empire—Vol. II.

The Deccan is a large table-land, triangular in shape, occupying a large part of Southern India. It is for the most part a region of wide valleys and gentle slopes with an average elevation of about 2,000 ft. The junction of this triangle with the Indo-Gangetic plain in the north is marked by a confused range of mountains running west to east (Vindhya 1,500 to 4,000 ft.). On either side of the plateau, there exist two mountain ranges known as the Western Ghats and Eastern Ghats. There are two strips of coastal plain between the Ghats and the sea called the Kankar and the Malabar on the west and Coromandel on the east. The Western Ghats rise steeply from the narrow coastal plain and stand like a gigantic wall facing the Arabian Sea. At its eastern side the plateau descends to the Bay of Bengal in a series of irregular spurs and ridges known as the Eastern Ghats. The presence of the ghats makes the inland region peculiarly liable to drought and famine. The coastal strips are composed of alluvial soil and get good rainfall, hence agriculturally they are the most important areas of the Deccan. Also, in the north-west there is a large area of deep, rich, moisture retaining soil, known as the "black cotton soil." The chief Peninsular rivers are the Narmada, the Tapi, the Mahanadi, the Godavari, the Kistna and the Cauvery. As the sloping of the plateau is towards the east most the rivers flow into the Bay of Bengal, only the Narmada and the Tapi flow west to the Gulf of Cambay in the Arabian Sea. The rivers being rain-fed mostly, dry up in the hot weather and none of them is navigable for any great distance.

The chief agricultural products of this region are millets, rice, oil-seeds, coconut, pulses, cotton, tea, coffee, spices and rubber. Evergreen forests cover the Western Ghats from Cape Comorin to Gujerat and valuable trees like

teak, *ebony* and *sandalwood* grow plentifully. The plateau is also rich in mineral resources. Gold, iron and mica are the most important of the minerals found here.

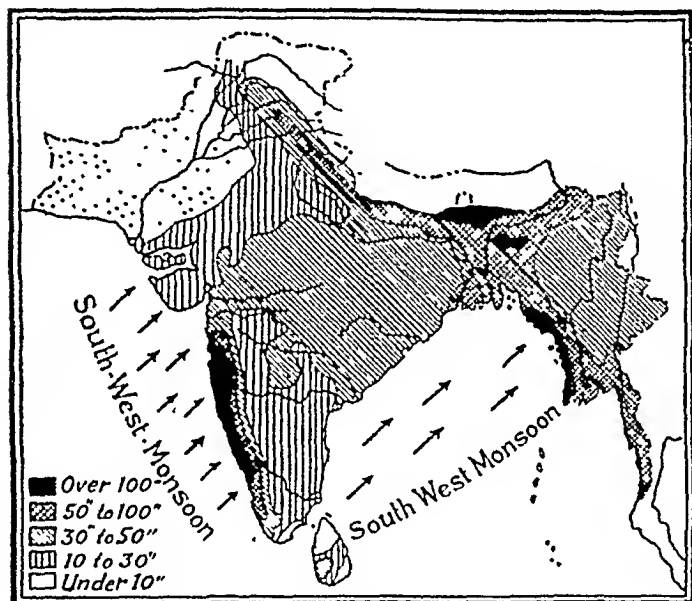
Climate.—The Tropic of Cancer, cuts through India from west to east, so that while one half of the sub-continent lies in the Temperate Zone, the other half is located in the Torrid Zone. Yet, India is commonly regarded as



WINTER RAIN AND WINDS

a tropical country. In summer the sun is vertical—or nearly vertical—over a large part of the country, which in consequence gets very hot; at this season the Punjab plains are among the hottest regions of the world. But this heat generates various low-pressure centres over the plains of the

Punjab, and thus draws in cooler winds from the sea. As Temperature a consequence of this, other parts of India are not as hot as it should be. The July average for north-west India is considerably above 90°F ; in north-east Bihar and north Gujerat it is between 85° and 90°F . Towards east and south temperatures are lower; in Bengal and Central India



SUMMER RAIN AND WINDS

it is between 80° and 85°F ; in Bombay and adjoining tracts the temperature is between 70° and 80°F , or even lower. Madras, however, has higher temperatures (80° - 85°) as the winds there blow from the land. In winter, on the other hand, when the sun is considerably south of the Tropic of Cancer, it is cooler and cooler from south to north; the January average for the Punjab plains is between 40° and

60°F; over the greater part of Central India it is between 60° and 70°F. In Bombay, Hyderabad, Mysore and the adjoining regions it is between 70° and 75°F; In Madras, however, the temperature rarely sinks below 75°F.

The Indian year is divided into three well-marked seasons according to rainfall and temperature:—(1) the winter season from October to February, (2) summer from March to June and (3) the rainy season beginning practically from the middle of June to the end of September. From the economic point of view the rainy season is the most important of the seasons of India.

We have already seen that India belongs climatically to the great *monsoon* region of Asia. *Monsoon* comes from an Arabic word "Mausim" meaning season and in India Monsoon means the rainy season. The rainfall in India is mainly influenced by the monsoons although the direction of the winds as well as the distribution of rainfall is governed by topography. India has two distinct periods of rainfall one just after summer and the other during the winter. The former is caused by the South-west monsoon and the latter by the North-east monsoon. The South-west monsoon, which is the continuation of the South-east Trade wind, blows from sea to land. It carries with it particles of water and gives rain to India from May to September. It brings to the country about 90 per cent of its total rainfall and reaches the country in two currents—the Arabian Sea current and the Bay of Bengal current. The Bengal current freely traverses the east coast, Burma, Bengal and Assam and gives ample rainfall to these areas. The wind is then deflected up the Ganges valley as a south-easterly wind by the Himalayas. As it travels westward the rainfall diminishes in quantity and certainty. The Arabian Sea-current showers torrential rains on the coastal strip of the

Western Ghats but fails to bring an adequate supply to the central part of the Peninsula. It also gives some rain to the Central Provinces.

The North-East Monsoon blowing from land to sea gives very little rainfall to India. It starts in October and lasts till the end of May. Madras receives some rainfall in the eastern coast by the North East Monsoon.

Thus we find, that *rainfall is not constant* all over India. This mal-distribution of rainfall, has given rise to a simple classification of climatic regions in India, based on rainfall. *Four areas* may be distinguished according to Mr Stamp.¹

(1) *Regions with more than 80 inches of rainfall annually.* Bengal, Assam, Bombay etc., are included in this division which also may be termed as "the areas of certain and heavy rainfall". *Evergreen forests* form the typical vegetation of this region. *Rice, tea and jute* are the important crops.

(2) *The rainfall division, inter between 40 and 80 inches of rain annually.* This division includes some parts of the N. E. Plateaus and the Middle Ganges Valley and may be termed as "the areas of moderate rainfall". *Rice* is the main food crop here, maize, sugar-cane and oilseeds are also important. This is the area of deciduous forests, the trees of which become leafless in the hot weather. Irrigation is a necessity here as a preventive measure.

(3) *The rainfall division with rainfall between 20 and 40 inches* consists of (a) Carnatic or Tamil region, in which rainfall occurs in November and December. (b) Southern and North-Western Deccan with mean January temperatures of 65° to 75°F. The typical place is Hyderabad. (c) Upper

¹ L. D. Stamp—*Asia* pp 191-192.

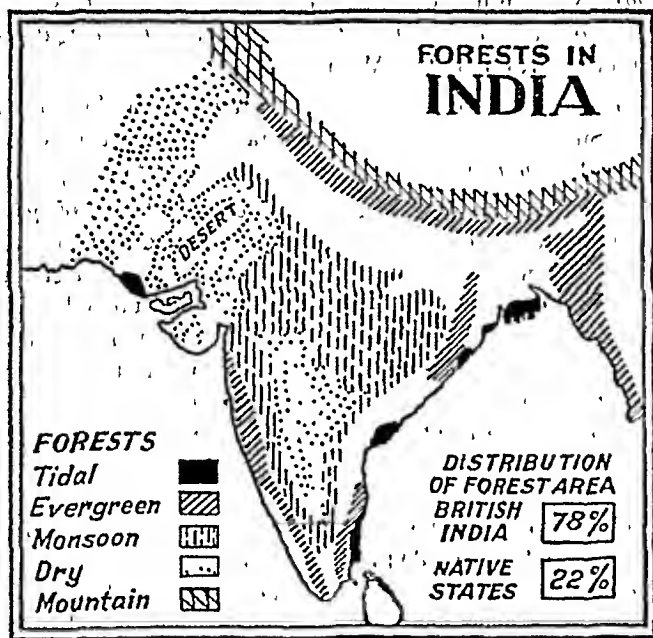
of the most extensive lava regions in the world. The island of Ceylon, although politically outside the 'Indian Empire,' is structurally a detached mass of the Deccan Plateau.

India has a wide variety of soils, but four main types can nevertheless be recognised among them, one consists of the *alluvial soils* of the Indo-Gangetic plain; these, generally speaking, are the richest of all. The eastern and the western coastal strips of the Deccan have also this type of soil. Very rich chemically, these soils have sufficient moisture-retaining capacity. Intensive cultivation has developed in this area. Another type is the *'Black' cotton* or *regur* soils which are widely distributed throughout the northern and the western portions of the Deccan. These soils are very fertile and well-suited to cotton cultivation. A third consists of the *red soils* overlying the rocks of the Archean system in the south and south-east. These soils are not very rich in chemical properties. The fourth type is the *laterite soils* which are generally not very productive. The common characteristic of all the types of soils is their comparative dryness and as such the problem of water supply is very important in India.

Forests.—In India the great variations of climate result in the existence throughout the country of widely different types of forests. About 22 per cent, of the total area of the country is forested. The main types of forests in India are—

(i) *'Evergreen forests'* occur in areas having more than 80" of rain annually i.e., along the slopes of the Western Ghats, the eastern Himalayas upto 5,000 ft, and in Assam. They contain valuable timber trees like *teak*, *chony* and *sandalwood*, and many varieties of *palms* and *bamboos*.

(ii) *Monsoon forests* naturally are found in areas having more than 40" of rain annually. The trees are deciduous and they shed their leaves in the hot season. The two most useful trees of such forests are the *sal* and the *teak*. The *teak* is now obtained mainly from the western parts of the Peninsular India and the *sal* from the north-east of the Deccan and the lower slopes of the Himalayas. *Rosewood*, *chony*, and *mango* are the other important trees



DISTRIBUTION OF FORESTS IN INDIA

(iii) *Mountain forests* of evergreen trees like those of temperate lands are found on the Himalayas above 3,000 ft, and on the mountainous tracts of the Deccan above 5,000 ft.

Some of the trees belong to the *Oak* species (broad-leaved) and some to the coniferous type (needle-shaped pine). In the E. Himalayas and Assam *oaks*, *magnolias* and *pine trees* are the characteristic trees. In the N. W. Himalayas *deodar* is the chief timber tree.

(iv) *Tidal forests* grow in river deltas and along the sea coast where it is flat and swampy. The characteristic trees belong to the *mangrove* family. These forests produce *sundri* wood utilised in making boats, masts and wheels. These forests are found in the Sunderbans of Bengal and northern portion of the Madras coast.

(v) *Dry forests* occur in arid regions of the Punjab plain, Sind, Rajputana and Baluchistan. The most important tree is the *babul*, the bark of which is a good tanning agent.

The existence of large tracts of forests is of great benefit to every country which is so fortunate as to possess them. In India the value of the forests lies in the fact, that they provide timber and fuel wood, grazing and fodder for the cattle and edible fruits and roots for human beings. Neglect of her forests in the past has caused India serious and permanent disadvantages. Many fine forests, specially the historic forests of the Gangetic plain, have been sadly depleted, due to reckless and ignorant destruction of forest trees. However, the task of preservation of forests has been seriously undertaken by the Government. The forest wealth of India is divided into two main groups—(a) *Major produce—i.e.*, timber and fuel wood and (b), *Minor produce—i.e.*, bamboos, lac, essential oils, turpentine and resins, dyeing and tanning materials, and herbs and spices. A very small proportion of the country's vast forest areas has only been exploited for the extraction of timber, owing to the difficulty of transport from the remote and difficult regions in which they are situated. As a result, there is

an enormous wastage of good timber for which no commercial use can at present be found. The best known timbers exploited now are *Sal*, *Teak* and *Deodar*. The *Sal* forests are found largely in the Ganges Valley, Sub-Himalayan tract, Assam (Nowgong district), Chotanagpur, Orissa and the Central Provinces. The timber is very hard and durable. The *Teak* forests occur mostly on the Western Ghats, Nilgiris and Central India. Indian *Teak* is not of a very good quality. *Deodar* forests occur in the north-western Sub-Himalayan tracts and are found to exist at an elevation of 5,000 to 8,000 ft. The timber is moderately hard and very durable. They are used extensively in making furniture and in constructional work and are in large demand for making railway sleepers. The minor products obtained from Indian forests supply important raw materials for the industries and are also in wide demand in foreign countries. India has practically a monopoly of the *Lac* industry and the export is of great value. It is obtained from three main areas—(1) Central India, Chotanagpur, Orissa, Bihar, C. P., and the north-eastern forests of Hyderabad State, (2) Sind and (3) Central Assam. *Shellac* obtained from lac is used in the manufacture of varnish, gramophone records and insulators. *Oil* obtained from *Sandal wood* is used in the manufacture of soaps. *Resin* obtained from the *pine* and *chir* trees is used in a number of industries such as paper making, soap making, etc. *Myrabolans* found in Central Provinces, Orissa, Madras, Bombay, Bengal and other places provide valuable tanning materials. *Babul pods*, *Mangrove barks* and *Tarvad barks* are the other principal tanning materials. *Bamboos* are now being utilised in paper-making. Though Indian forests grow spruce and silver Fir in large quantities yet difficulties of transport render their exploitation difficult and expensive.

The U. S. A., Germany, U. K., and France are the principal buyers of hides and skins from India. The leather centres are Cawnpore, Lahore, Agra, Calcutta, Delhi, and Madras. Indian hides are of poor quality being derived mostly from the diseased, old and naturally dead animals. Comparatively few animals are killed for meat. In western countries hides and skins are the by-products of the meat industry. Negligence of the butchers is also responsible for the spoiling of the hides and skins. It is felt that India has not made the best use of her ample resources of hides and skins. The demand of the products made from leather is gradually increasing in India but the Indian Tanning industry is not much developed. Modern methods of tanning have been adopted in Banāgalore, Madras, Cuttack, Cawnpore, Agra, Gwallior and Calcutta.

Wool.—The annual production of wool in India is approximately 85 million pounds on the basis of 1·9 lbs. of wool per sheep per annum as compared with 7·5 lbs. per annum in Australia. Again the wool of the Indian sheep is short-stapled and much inferior to that of Europe and Australia. They are generally suitable for the manufacture of blankets, rugs, carpets and felt; but Bikaner wool is of good quality. The production of wool in the various provinces and states is given in the following table:—

Annual production of Wool in different areas.

1939-40

Area	Number of sheep (lakhs).	Annual yield of wool per sheep (greasy) (basis) lb	Annual production of wool (lakh lb.)	Percentage to total production.
Kashmir State	12.5	1.5	18.5	2.2
North-West Frontier Province including Agency and Tribal areas ..	8.4	3.4	28.3	3.3
Br. Baluchistan and States ..	15.1	3.2	48.6	5.7
Sind and Khairpur State ..	7.8	4.0	30.9	3.6
Punjab	44.2	3.8	169.7	20.0
Punjab States	13.6	3.8	52.3	6.2
United Provinces and States ..	22.0	4.3	75.1	11.2
Rajputana States	53.2	3.1	164.5	19.3
Western India States ..	12.5	3.7	46.3	5.4
Bombay including Deccan States	21.1	1.0	21.1	2.5
Mysore States	26.0	0.85	22.1	2.6
Madras and States	121.9	0.56	69.4	8.2
Hyderabad State	59.4	0.56	34.0	4.0
Central Provinces	5.8	2.0	11.7	1.4
Bihar	11.5	0.81	9.3	1.1
Orissa	4.0	0.75	3.0	0.3
Bengal and States	5.1	1.1	6.0	0.7
Other areas*	9.7	2.0	19.5	2.3
Total India	453.8	1.9	850.3	(100.0)

It will be observed that production is mainly concentrated in the North-Western parts of the country, comprising the Kashmir State, North-West Frontier Province, Baluchistan, Sind, the Punjab, the United Provinces,

* Includes Delhi Province, Central India and Bundelkhand States, Baroda State, Gujrat Agency, Eastern States, Assam and Assam States

Rajputana and Western India States This tract together accounts for nearly 77 per cent., of the Indian production of wool. Amongst the above-described areas, the Punjab and Rajputana lead in the production of wool, each accounting for nearly a fifth of the total annual output. The yields in this tract are also comparatively high.

In the Southern and Eastern tracts, although there are generally a larger number of sheep, the production is low on account of poor yields. Madras, for example, has the largest number of sheep (about three times as many as in the Punjab), but the production of wool is only about 41 per cent., of the latter province. The sheep of Mysore and Hyderabad States are also poor producers of wool.

The internal consumption of home made wool is small as it is unsuitable as a clothing material and a large quantity of wool is imported by Indian woollen mills from Australia and South Africa. In the pre-war days the United Kingdom was the chief customer for Indian wool. Some wool is also exported to the United States of America.

Dairy Products.—Dairying on a large scale is almost undeveloped in India. The industry is indigenous throughout India. The chief products are *milk*, *butter* and *ghee*. The annual production of milk in India has been placed in the neighbourhood of 800 million maunds, valued at Rs. 300 crores. The milk is mainly obtained from cows and buffaloes although goats also supply a large quantity. India stands second to the U. S. A., in the volume of her milk production. In spite of the huge output of milk, the consumption of milk in this country per head is the lowest of the world. The supply of milk in big cities is inadequate as room for grazing is not available in the heart of congested cities and quick transport of pure milk from villages is difficult to arrange for. This has resulted in a serious

shortage causing heavy infant mortality. Hence, it is necessary that dairies on a large scale should be started in villages and in the neighbourhood of cities and arrangements should be made for the fast transport of milk to the markets. The development of this industry on a co-operative basis will not only improve the economic condition of the Indian ryot but will also solve the problem of milk supply. Besides milk *ghee*, *butter* and *cream* are also produced. *Ghee* is made out of butter by heating it for 8 to 10 hours so as to remove the moisture by evaporation. It has an important place in the dietary of the Indians. Although it is produced throughout the length and breadth of the country, the U. P., Rajputana, N. Bihar, the C. P., and Madras produce *ghee* in large quantities. The chief centres of *Butter* industry are Bombay, Ahmedabad and Aligarh. The butter is tinned for internal distribution and foreign export. This industry has a bright future.

Fisheries in India

Fisheries in India are restricted mainly to inland waters and estuaries. Although India has a long sea-board, extending over thousands of miles yet sea-fisheries are not much developed. At present fresh-water fisheries exist in almost all the provinces and a few states in India. Bengal leads in fresh-water fishing, followed by Orissa, Assam, Behar, U. P., and Madras. The consumption of fresh fish is also the highest in Bengal. The inland fisheries of Madras suffer from this disadvantage that many of the rivers dry up in summer. The principal rivers of Bengal, with their innumerable branches and tributaries offer enormous possibilities for fresh-water fishing. *Rohu*, *Mirgal*, *Catla*, *Hilsa* etc., are the best varieties of fish obtained. The *Hilsa* moves up the rivers during the rains for the purpose of

Inland
Fisheries.

spawning and goes back to the sea in winter. There are also innumerable tanks and *jheels* in Bengal which yield a huge quantity of fish. Inland fisheries, as a source of food have unlimited possibilities of development, provided sound cultural methods, more or less similar to agricultural practices, are adopted for increasing the supplies of suitable fishes. Tank fisheries should be improved so that every village and every town will be more or less self-sufficient for its fish requirements. The habit of the people, their fishing implements and the method of catching all require a drastic change.

The Estuarian fisheries are mainly in the *Sunderbans* (Gangetic estuary). These fisheries are situated at a great distance from the markets, so their development depends mainly on the provision of better modes of transport. Extensive culture of mullets, *Bhetki*, etc., should be practised in selected areas and within the vicinity of tidal supply of salt water. Introduction of modern fishing crafts and tackles can help a lot in this direction. Refrigeration and cold storage are the only means by which fresh fish can be preserved. So quick freezing centres should be established near about the places of capture.

Sea-fisheries are mainly confined to coastal waters of Bombay and Madras Presidencies. The coast line of Madras is margined by a shallow water area suitable for feeding and spawning of fish. Sardines, mackerel, cat fish, jew fish etc., are caught. But the vessels used are primitive rafts which are made of logs of timber tied side by side and this type of vessel does not go farther than 3 miles from the coast, hence deep sea fisheries are practically absent in Madras. Want of good harbours also is a serious disadvantage. The fisheries of Bombay are mainly sea-fisheries. Bombay has a long coast line with excellent

harbours and the fishermen of Bombay are very efficient. Sea-fishing is as yet little developed in Bengal. There is an unlimited supply of edible fish in the Bay of Bengal. The bay also possesses the characteristics of a good fishing ground. But no systematic effort has yet been made to exploit this aquatic wealth of Bengal. Moreover, Bangalees do not like the taste of sea-fish. This distaste can be removed by constant propaganda and proper selection of fish. Sea-fishing also is carried on in the coastal waters of Orissa, Gujarat and Sind. All provincial governments possessing sea-boards should take up this matter energetically. India in general and Bengal in particular will be much benefitted economically by the development of sea-fisheries.

Pearl fisheries exist in the Gulf of Cutch and in the extreme South of Deccan.

AGRICULTURE IN INDIA

Throughout India agriculture is the chief occupation of the people. Here, more than 87% of the population depend directly or indirectly on agriculture for their subsistence. Fertility of soil, ample rainfall and facility of irrigation due to the existence of a net work of rivers and canals have made India pre-eminently an agricultural country. Agricultural production not only provides all the food-grains consumed within the country but also gives a surplus for export. India is also an exporter of commercial crops. Although agriculture is the single largest industry in India it is in a hopelessly backward and stagnant condition. The outturn per acre of nearly all the crops in India is ex-

The position
of agricul-
ture in
India.

ceedingly low.* This is generally attributed to (a) soil exhaustion, (b) the export of natural manures in the form of oil-seeds, (c) uneconomic farming arising out of subdivision and fragmentation of lands due to current laws of inheritance, (d) illiteracy and poverty of the cultivators. And the whole system of causes generally operate like a vicious circle. In order to ensure the all-round economic progress of India, more attention should be given to the improvement of Indian agriculture. Between 1891 and 1941 India's population increased from 221 to 389 millions. Some improvement in agriculture has no doubt been effected during the last fifty years but the increase in food-production is not keeping pace with the growth of population. India is gradually becoming a substantial importer of food-stuffs instead of an exporter. The last World War (1939-45) completely exposed the weakness of India's food position. Perhaps, never before in the history of India, such an acute shortage of food-stuffs has occurred as is now prevailing. The famine in Bengal in 1943 resulted in the loss of 15,00,000 lives. If Indians want to increase their food-supply they must raise the standard of cultivation and crop-yield. In a scientific age, it is deplorable, that India is not making use of scientific methods in agriculture. In fact, the administration in India suffers from lack of fore-sight, planning, and organised work. The condition of Russian agriculture, 25 years ago, was similar to that of India. To-day she has made vast improvements in agriculture and is almost self-sufficient in food-stuffs and vegetable raw materials.

* India's output of sugar per acre is said to be less than $\frac{1}{3}$ of Cuba's, $\frac{1}{6}$ of Java's and $\frac{1}{10}$ of Hawaii's. As regards cotton while the U. S. A. produces 200 lbs. per acre, Egypt produces 450 lbs. per acre, India produces only 85 lbs. per acre. Whereas the average yield of wheat per acre is as high as 44 bushels in Denmark, 17 bushels in Canada, 32 bushels in Germany, India's outturn per acre comes to as low as 11 bushels on the average.

The situation in India is such, that a transformation of equal magnitude which has occurred in the U. S. S. R., is called for.

The net area under cultivation in India is over 250 million acres of which 80 per cent., is devoted to food crops and 20 per cent., to non-food crops. Rice, wheat, barley, millets, gram, sugarcane and maize are the principal

Area under and Yield of Principal Crops
1942-1943

Food Grains	Area (in 1,000 acres)	Yield (in 1,000 tons)	Non-Food Grains	Area (in 1,000 acres)	Yield (in 1,000 tons)
Rice	74,919	24,533	Jute	2,602	6,948 (bales)
Wheat	34,298	10,971	Cotton	18,812	4,554 (in 1,000 bales)
Barley	6,052	1,852	Groundnut	7,431	2,714
Jowar	21,680	4,512	Linseed	3,408	411
Bajra	13,564	2,320	Tea	853	568,600 (in 1,000 lbs.)
Maize	5,810	2,118	Tobacco	1,100	610
Sugarcane	3,590	..			

food-crops. The main non-food crops are cotton, jute, oil-seeds, tea, coffee, tobacco, rubber and hemp. Northern India has more land under plough than southern India more because of the greater proportion of plain level land and favourable climatic conditions.

India normally has two harvests—the *Kharif* harvest in October and November for crops sown in the early weeks of monsoon and the *rabi* harvest in January or February for crops sown at the end of monsoon. These

harvests often alternate on the same piece of land; double cropping upsets this rotation.¹

Rice. It is the most important food-grain of India. It is wholly a "wet region crop", grown mainly on flat alluvial soil where rainfall is abundant. Where, however, the annual precipitation is below 40" it can scarcely be grown except on irrigated land. Where conditions are favourable, it generally takes 120 to 150 days to grow. In India, rice is grown in all seasons. Rice crop is known as autumn crop, winter crop or summer crop according as the crop is harvested in autumn, winter or summer. The *winter rice* ripening in December and January forms about 75 per cent., of the total annual produce. Two crops are generally obtained in one year from the same field but in canal irrigated districts of Bihar and Madras as many as three crops are raised on the same field annually.² Rice covers about a third of the total cultivated area of India and is a typically monsoon plant. The production of rice is greatly influenced by the S W. Monsoon and its failure has a very damaging effect on the crops. It is chiefly grown in *Bengal, Bihar, Orissa, Assam and Madras*. The Central Provinces, Bombay, the United Provinces, Sind and the Punjab are also fairly important producers. The chief rice-growing province is Bengal, from the point of view of both acreage and yield. Rice is grown in all the districts. It is also grown in the Indian States such as Hyderabad, Mysore, Coorg and Baroda. The area under rice in 1942-43 was 74,919,000 acres and the yield was 24,533,000 tons. The normal yield per acre of cleaned rice in India varies from 648 lbs. to 1580 lbs, which compares very unfavour-

¹ Stamp—Asia

² B. B. Mukherjee—*Economic and Commercial Geography of India*

ably with Japan and Egypt, where it is between 2,352 and 2,464 lbs.

Area and Yield of Rice in India
1942-43

		Area (in 1,000 acres)	Yield (in 1,000 tons)
Bengal			
Autumn crop	..	6,507	1,693
Winter "	..	16,207	5,020
Summer "	..	428	203
Madras	..	10,394	4,575
Bihar	..		
Autumn crop	..	2,352	684
Winter "	..	6,911	2,564
Summer "	..	12	4
C. P. and Berar	..	7,617	2,378
United Provinces	..	7,094	1,858
Assam			
Autumn crop	..	1,066	294
Winter "	..	3,816	1,236
Summer "	..	201	92
Bombay	..	2,628	1,155
Sind	..	1,322	324
Orissa	..	5,055	1,247
Punjab	..	1,097	384
Hyderabad	..	1,095	473
Mysore	..	754	231
Baroda	..	241	52
Coorg	..	88	60
Bhopal	..	34	6
Total	..	74,919	24,533

Rice is the staple food of the people in the eastern part of India. Consumption within the country is so great, that very little rice is exported. Barely 1 per cent., of the total production is exported to Ceylon and other Asiatic countries. On the other hand, India imports a considerable amount of rice from other countries of Asia, especially from Trade.

Burma. Imports of rice not in the husk from Burma during 1940-41 amounted to 1,173,000 tons (Rs 12,50 lakhs) as against 1,767,000 tons (Rs 16,65 lakhs) in 1939-40.¹ The food-crisis which developed in India in 1942-43, was due in no small measure to the temporary occupation of Burma by the Japanese. The food position of Bengal further worsened by the failure of crops in Midnapore, Barisal, Dinajpur and 24 Parganas. Even in the face of impending food shortage, total exports of rice in 1942-43 amounted to 255,000 tons.²

Wheat. India is one of the five chief wheat-producing countries of the world. In this country it is a *winter crop* sown after the rains and the harvest is gathered just before the heat of summer commences. During the seeding and germinating period, wheat requires a moist and cool climate. Warmth is required when the heads of the stalks are being formed. Immediately before the grain begins to ripen a little rain is helpful but for the ripening a dry sunny weather is absolutely essential. Wheat generally does not grow in a humid climate where the rainfall is more than 30" annually. In different parts of India, the climatic requirements of wheat are obtained by adapting seed-time and harvest to the local climatic conditions. In this country it thrives best in clayey alluvial soil. It is also grown as a dry crop in black soil of the Deccan.

The wheat belt of India stretches from the North-Western Frontier Province to the north-western part of Bihar on the east and as far as the Dharwar district of the Bombay Presidency on the south. The most important wheat fields, however, lie in the United Provinces, the Punjab and the N. W. Frontier Province; but wheat

¹ Review of the Trade of India 1940-41.

² Review of the Trade of India 1942-43.

gradually disappears down the Ganges Valley with increasing moisture, heat and rainfall. The total estimated area under wheat in 1942-43 was 34,298,000 acres as against 34,039,000 acres in 1941-42. The total yield of the crop in 1942-43 was estimated at 10,971,000 tons as compared with 10,037,000 tons in 1941-42.

Area and Yield of Wheat
1942-43

Provinces	Area (in 1,000 acres)	Yield (in 1,000 tons)
Punjab	10,395	4,152
United Provinces	7,573	2,697
C. P. and Berar	2,540	510
Bombay	1,345	227
Sind	1,356	429
Bihar	1,280	581
N. W. F. Province	1,120	325
Bengal	179	53
Punjab States	1,768	655
Central India States	2,040	266
Gwalior	1,328	275
Hyderabad	967	138
India's Total . . .	34,298	10,971

The Punjab is the chief wheat-producing region of India. The districts of Multan, Ferozepur, Attock, Shahpur, Montgomery, Gurudaspur, Gujranwala, Jhang and Lyalpur devote more than 50 per cent of the sown area to wheat cultivation. The larger part of the Punjab crop is under irrigation, particularly in the new canal colonies. In the Punjab, the wheat crop has engaged the attention of the Agricultural Department since 1907 and the latest returns indicate that more than 3,500,000 acres in the province are sown with improved types of wheat. The chief wheat-producing districts in the U. P., are Saharanpur, Dehra-Dun,

Meerut, Muzaffarpur, Shajahanpur, Etwahl, Badaun and Nainital. In the N. W. F. Province the districts of Bannu, Kohat and Peshwar are the important wheat-growing districts. Wheat accounts for more than 50 per cent., of the cropped area in the districts of Saugor and Hosengabad in C. P. Jubbulpore is also a fairly large producer. In the Bombay presidency the chief wheat-growing areas are Broach, West Khandesh, Nasik, Ahmedpur, Bijapur, Belgaum and Dharwar. The acreage under wheat in Bengal is extremely low in comparison with the other wheat-growing provinces of India, due to very humid climatic condition. The districts of Maldah, Murshidabad, Nadia, Rajshahi, Pabna and Birbhum grow wheat in small quantities.

Although India occupies a prominent place among the wheat-producing countries of the world, yet the average yield per acre is very low—only 11 bushels¹ an acre annually. This is due to the primitive method of cultivation in India, because of the poverty of the agriculturists, smallness and scatteredness of the holdings, want of good manures, lack of co-operative effort for the collective use of machinery etc. The output per acre varies from 882 lbs in Bihar, 786 in U. P., 738 in the Punjab, 593 in Sind to 231 lbs in Hyderabad.² Indian wheat suffers from inferiority of quality also. Most of the varieties of wheat fall within the definition of *soft wheat* commercially. But there are hard wheats (red and yellow) grown in Central India which find a market in France and Italy. Indian wheat had at one time the reputation of being dirty, but it was established that this was not due so much to careless threshing or handling as to deliberate adulteration to conform to the

¹ One bushel of wheat=58 to 60 lbs

² B. B. Mukherjee—Economic and Commercial Geography of India.

practice of the English Grain Trade.¹ However, the Imperial Institute of Agricultural Research is working on the improvement of Indian wheat and it is reported that the amount of work already done in this direction has been by no means inconsiderable

Wheat is the staple food of the people in the drier west. The home demand being very great only a small surplus is sometimes left for export. Before the Great War I (1914-18) Indian wheat had a ready market in Europe; but after the conclusion of the war things were totally reversed: there was an enormous increase in yield of wheat in other exporting countries, and many of the importing Trade countries readily took to its cultivation—often under the protection of subsidies and tariff walls. Thus there set in a fall in the demand for Indian wheat. At present besides the U. K., the principal customers of Indian wheat are Burma, the Straits Settlements, Kenya, Aden, and Arabia. Since in India wheat is harvested when most of the countries begin to sow it, many of the importers are often forced by circumstances to buy from India. But, again, India sometimes is also forced to import some wheat from other producers, especially from Canada and Australia.

India also exports a considerable quantity of wheat flour. The chief destinations are Arabia, Straits Settlements, Kenya Colony and Aden. In 1940-41 India exported 45,000 tons of wheat and 66,000 tons of wheat flour.² The principal ports of export are Karachi, Bombay and Calcutta. The dryness of Karachi gives it an advantage over Bombay and Calcutta. There wheat awaiting shipment can be stored at the docks in open sheds with very little risk of damage by rain. No less than 90 per cent of the shipment of wheat

¹ Cotton—Handbook of Commercial information for India

² Review of the Trade of India 1940-41

is from Karachi. The export of wheat from India in 1942-43, was drastically cut down to 8,000 tons only, in the interest of the food-situation of the country.¹

Barley. It is very nearly co-extensive in its distribution with wheat. It is also a *winter crop* in India. It is chiefly grown in the United Provinces, Bihar, the Punjab, the North-West Frontier Province and Bengal. The total area under the crop in India in 1942-43 was 6,052,000 acres with an yield of 1,852,000 tons. Of the four million acres in the U. P., the greater part is in the Gorakhpur, Benares, Lucknow and Allahabad divisions. Owing to a large internal demand export of barley is insignificant. In 1942-43 only 300 tons were exported.

Millets. A number of food-crops in India, are included under the heading of the millets, of which the most important is *Jowar* or *cholum*, which constitutes the staple food of the agricultural population of the Deccan and is also used in parts of the U. P. The straw is utilised as a fodder for cattle. *Bajra* or *Cumbu* is another important variety. It can be grown even without irrigation in areas having an annual rainfall of 20" and where again the rainfall is above 40" it does not grow. These are grown in the rains as well as in winter. They grow both in the black soil and in alluvial soil. The chief *Jowar* producing areas are Bombay, Hyderabad, Madras, C. P., U. P., Punjab, Rajputana, and Central India States. *Bajra* is widely cultivated in Bombay, Sind, Punjab, Madras, U. P., C. P., Hyderabad and North-West Frontier Province. The total yield of *Jowar* in 1942-43 was estimated at 4,512,000 tons. The yield of *Bajra* in 1942-43 was estimated at 2,320,000 tons. Neither of these millets is at any time extensively exported. Exports of *Jowar* and *Bajra* in 1941-42, amounted

¹ Review of the Trade of India 1942-43.

to 5,000 tons valued at about Rs. 5 lakhs¹ Arabia, Aden and French Somaliland were the chief customers Bombay and Karachi are the chief ports of export. In 1942-43 6,000 tons were exported, the demand from Ceylon having increased.

Maize. It flourishes in areas having a warm climate and moderate rainfall In the dry regions it is found in association with millets and in the wetter regions with wheat But it does not grow in areas having more than 60" and less than 20" of rainfall annually. A fertile loamy soil capable of retaining moisture is essential for its production. Where rainfall is not abundant water must be supplied by irrigation. Garden plots or patches of maize may be found practically all over India, but extensive cultivation is confined to the United Provinces, Bihar, the Punjab, the North-West Frontier Province, Sind, Bombay and the Central Provinces and Berar in British India and Hyderabad among the Indian States The estimated area under this crop in 1942-43 was 5,810,000 acres and the yield 2,118,000 tons Greater part of this crop is locally consumed and trade in maize is insignificant. Export of maize from India in 1942-43 amounted to 3,000 tons, the whole of the amount being taken by Ceylon.

Conditions of
production

Areas of
Production.

Oats. The cultivation of this crop is not very important in India It is grown as a *rabi* crop in Delhi and Hissar districts of the Punjab and the Meerut districts of the United Provinces It is also cultivated for the grain to a limited extent in the Poona, Ahmednagar, Satara and Ahmedabad districts of the Bombay Presidency. Elsewhere, it is generally cut green for cattle fodder No separate statistics of area or production are maintained and the

Areas of
Production.

¹ Review of the Trade of India 1941-42.

foreign export trade is normally insignificant in comparison with that of other grains produced in the country.¹

Pulses. Of the numerous species included in the category of "pulses" the most important are gram, *arhar*, lentils, beans and peas.

Gram is probably the most important of the pulses grown in India. In 1940-41 it was sown over an area of more than 12 million acres of which the Punjab and the U. P., have the largest shares. Other important producing areas are Bihar, Central Provinces, Bombay, Sind, Hyderabad and Mysore. The total estimated yield in 1940-41 was about 3·5 million tons. 'It is an important crop, especially in areas of rather scanty rainfall, not only because of its grain but because being *leguminous*, it adds nitrogen to the soil.' Hence it is often grown with cereals and forms 'a good alternating crop.' The major part of the crop is locally consumed and exports, even in years of plenty, are limited.

Of the other varieties the lentil or *masur* and *arhar* enter largely into the diet of the people. The minimum food requirement of the people in our country is either *Dal-bhat* or *Dal-roti*. The lentil is grown as a winter crop all over India especially in the C. P., Madras and the U. P. Its nutritive value is very great. *Arhar* is grown as a mixed crop, usually, in rotation with cereals. The total production of the above mentioned two pulses is very great but the exports are negligible. Exports of pulses, consisting mainly of *dals* and lentils in 1940-41 amounted to 88,000 tons valued at Rs 107 lakhs.² The United Kingdom,

¹ Cotton—Handbook of Commercial information for India

² Review of the trade of India 1940-41

Ceylon, Straits Settlements, Mauritius and Burma were the chief destinations.

Sugar-cane. India is believed to be the original home of sugar-cane and the existence of a sugar manufacturing industry here can be traced back twenty-five centuries. It is essentially a tropical or sub-tropical plant and flourishes in a warm moist climate. But the moisture has its limits too; an annual rainfall of 40 inches or a little more is ideal for the plant. Too much moisture reduces the sugar-content in the juice. It grows best on rich porous clays and on alluvial plains. Sea-breeze is said to be wholesome for the plant. Climatic conditions are very favourable for the growth of sugar-cane in India and it has probably the largest area under cane cultivation in the world. In 1942-43 the area under sugar-cane was estimated at 3.5 million acres, which represented about 25 per cent of the total sugar-cane acreage of the world. Three-quarters of the area used for sugar-cane lies in the three provinces of the United Provinces, Bihar and the Punjab. Climatic conditions here are ideal for the growth of sugar-cane. Network of rivers and canals provide facilities for irrigation. The soil is well-suited to cane cultivation and as the cane harvesting season in these provinces falls between the *kharif* and the *rabi* harvests in months in which agricultural employment is small usually plentiful supply of labour is obtained without any difficulty. It is also grown in Bengal, Assam, Madras, North-West Frontier Province, Bombay, C P, Mysore, Orissa and Hyderabad.

Conditions of growth
Areas of Production.

The United Provinces have the largest area under sugar-cane in India. The chief producing areas are Gorakhpur, Azamgarh, Jaunpur, Ballia, Saharanpur, Bareilly, Meerut and Bulandsahar. In the Punjab the principal centres are Montgomery, Lyallpur, Lahore, Amritsar and

Jollandhur. The important cane-growing districts of Bihar are Saran, Champaran, Muzaffarpur, Sahabad and Patna. In Bengal Birbhum, Burdwan, Nadia, Dinajpore, Bogra

**Area under Sugar-Cane in different Provinces
of India (in 1,000 acres)**

Provinces			1940-41	1941-42	1942-43
U. P.	..	..	2,555	1,745	1,879
Punjab	.	..	549	456	449
Bihar	..	..	508	384	403
Bengal	.	..	331	314	303
Bombay	..	..	167	156	152
Madras	..	..	162	112	122
N. W. F. Province	.	.	96	85	78
Assam	..	..	41	40	42

Dacca and Mymensingh are the principal cane-growing districts. In Madras the Chittoor district has the largest acreage under sugar-cane.

Indian sugar-cane is very poor in quality. The yield per acre is also very low. In spite of cheap labour the cost of production of Indian sugar is much higher than elsewhere in the world. Though the area under sugar-cane in S. India is small, the cane grown there is much thicker and finer than in northern India. India consumes all the products of sugar-cane. A few years ago, India was an important importer of sugar. Even now, her entire production is not sufficient to meet the home demand. The Indian refined sugar industry is still in a state of infancy. *Gur* the boiled juice of sugar-cane from which the molasses is not removed, is chiefly consumed by the people. The total yield of *Gur* in 1941-42 was 3,957,000 mds. The total production of refined sugar was 778,100 tons in 1941-42. The Imperial Council of Agricultural Research and the pro

vincial agricultural departments are carrying on researches to improve the quality and yield per acre of sugar-cane in India. It is reported that much satisfactory work has been done in this direction and the area sown with scientifically improved varieties of sugar-cane in the sugar producing provinces continues to increase.

Tea. India is the second largest producer of tea in the world. Climatically it is said to belong "to latitude areas where high temperature, long growing season, and heavy well-distributed rainfall favour a rich, continuous and rapid growth of new tender shoots" It is essentially a sub-tropical plant requiring abundant seasonal rainfall and an uniformity of relatively high temperature. It requires deep fertile, well-drained soil rich in humus. Good drainage is essential, as stagnant water spoils the roots and yet there must be abundant rainfall. That is why hill slopes are always preferred for the cultivation of tea plant. The huge production of India is also due largely to the cheapness as well as regular supply of labour.

Tea plantation in India was introduced in 1834, "when Lord William Bentinck, the then Governor-General, unaware that the tea-plant was indigenous in Assam, warmly took up the matter and appointed officers to proceed to China and collect tea-seed and expert Chinese labour."¹ The remarkable increase in the rate of tea production in India, can be realised, when we consider that in 1878 the area under tea was about 200,000 acres with an approximate yield of 38.5 million lbs., whereas in 1941-42 nearly 833,700 acres under tea produced about 502 million lbs. Are
Production. Seventy-six per cent of the total area under tea lies in the Brahmaputra and Surma Valleys of Assam and in the districts of Darjeeling and Jalpaiguri in Northern Bengal

¹ Cotton—Handbook of Commercial Information for India

The hill slopes over the Malabar Coast in S. India (including the states of Travancore, Cochin, and the districts of Malabar, Nilgiris and Coimbatore in British India) contain nineteen per cent of the total. In northern India tea is cultivated only on a small-scale in the U. P., in the districts of Dehra-Dun, Almora and Kumaon Garhwal, in Nepal and in the Chota Nagpur district of Bihar and Orissa. In the Punjab it is to be found in the Kangra Valley, the states of Mandi and Sirmur and to a very small extent in the Simla Hills¹

Tea constitutes an important item in our export trade. More than 75 per cent of the total production is exported. In 1941-42 nearly 400 million lbs of tea valued at Rs. 39.57 lakhs were exported. Tea is much in demand in foreign countries. Great Britain is the principal importer of Indian tea and it is from there that tea is re-exported to different parts of the world. Canada, the U. S. A., Australia and the U. S. S. R., are also important importers. Owing mainly to over-production the price of tea fell in 1930-32 and the representatives of the tea industry from India, Ceylon and Java voluntarily entered into an agreement to restrict its export as well as the extension of acreage under it. This is known as the 'tea restriction scheme'. It came into operation from 1st April, 1933 and was to continue for a period of five years. A new scheme on the same lines is operating since 1938.

The home demand for tea is increasing but it is still insignificant compared with the total output. The fall in the price of tea a few years ago has drawn the attention of the industry to the development of the home market for its stabilization. Unless new markets are found and home

¹ Cotton—Handbook of Commercial Information for India.

consumption increases considerably, the tea industry, already burdened with the problem of over-production, is sure to face a major crisis. Under the Tea Cess Act of 1903, a duty is levied on all Indian tea exported. The Indian Tea Cess Committee spends the amount collected, in propaganda within the country for developing the tea-drinking habit of the people. The Committee has been changed and in its place the Indian Tea Market Expansion Board is working.

Coffee. It is a product of the tropical or sub-tropical lands. It requires a moderately high temperature and an abundant rainfall; but more important still is perhaps an equability of temperature and protection from the direct rays of the sun. A fertile and well-drained soil is also highly important. For that reason it thrives best at fairly high altitudes. It finds its most suitable environment on elevated land from which forest has recently been cleared. Soils for coffee should be rich in potash. (Page—104). In India coffee is sown and transplanted in the rainy season. It begins to ripen in October and handpicking continues till January. South India monopolises the coffee plantations. The most important plantations are at Mysore, where more than 50 per cent of the annual total output of India is raised. Madras, Coorg, Cochin and Travancore are the other producing areas. Systematic cultivation of coffee in India dates from 1830 but in 1866 many plantations were ruined because of a virulent disease attacking the coffee plants and the acreage under coffee declined since then. Since 1930-31 there has been an increase in the area under coffee under the stimulus of better prices and at present nearly 350 thousand acres are covered by coffee. Of this area Mysore accounts for about 60 p.c., Madras 20 p.c., Coorg 19 p.c., and Cochin and Travancore together 1 p.c. India is not a big producer of coffee in the world, being responsible for less than one per cent, of the output. The

Tea cess-

Conditions of growth.

Areas of Production.

Average-

coffee crop for India in 1942-43, was estimated at about 15,000 tons. The average annual output varies between 15,000 to 20,000 tons usually. In spite of the insignificant position India occupies in the world's coffee production, this country exports a considerable quantity of coffee to different countries of the world. This is chiefly because Indian coffee is superior in quality. The bulk of coffee produced is exported in normal times to France, the United Kingdom, Germany, Norway, Belgium, Canada and Australia.

By the Indian Coffee Cess Act of 1935, a duty has been levied on all Indian coffee taken by sea or by land to any place outside British India and the Indian Coffee Cess Committee has been constituted to which the amount collected is handed over to be spent for promoting the sale and increasing the consumption in India. Agricultural and technological research to improve the quality and quantity has also been undertaken by the Committee.

Tobacco. Although the tobacco plant is a native of the tropics it has a wide climatic range. It requires a light soil rich in humus, lime and potash. The soil requires liberal manuring as it is an extremely exhausting plant. It grows under different climatic conditions in different countries. In India the greater part of the crop is harvested between February and April. In this country large-scale tobacco tracts are few in number although it is grown in small scale almost throughout the country. Bengal, Madras, Bihar, Orissa and Bombay are the chief tobacco-producing provinces. In *Bengal* the main tobacco-growing areas are in the districts of Jalpaiguri and Rangpur and in the state of Cooch-Bihar. In *Bihar* the most important tobacco districts are Muzaffarpur, Darbhanga and Purnea. Guntur, Vizagapattam, East Godavari, Coimbatore

and Madura grow tobacco in *Madras*. Varieties of Virginian tobacco are grown in the Guntur district. In *Bombay* the tobacco-growing regions are the Kaira, Belgaum and Satara districts and the Baroda and other Indian states.¹

The importance of the Indian tobacco crop has increased substantially in recent years. The area upon which it is grown now is estimated at about 1,200,000 acres. India ranks third among the tobacco-producing countries of the world. About 90 per cent, of the tobacco within the British Empire is grown in India. However, only 2 per cent of the total output is exported and 98 per cent is consumed within the country. The reason of this small volume of export is that a large part of all the tobacco grown in India yield a dark coarse leaf unsuitable for manufacturing cigarettes. Attempts are now, however, being made to produce tobacco of better types in India by introducing good foreign varieties. Exports of tobacco in 1940-41 amounted to 75.3 million lbs., valued at Rs. 2,88 lakhs. Of the total quantity shipped in 1940-41, manufactured tobacco represented 93 per cent. The United Kingdom, China, Burma, Aden, Straits Settlements and Malaya States are the chief customers in normal times. India imports a large quantity of manufactured tobacco.

Quality and
Exports.

Cotton. The cotton plant has a remarkable climatic range but it is basically a dry region crop. It does not flourish in areas having a rainfall of over 40 inches a year. Most of the Indian cotton is grown in areas having a rainfall between 20" and 40". A moderate rainfall, plenty of sunshine and uniformly warm weather without too much heat are the chief requirements of the cotton plant.

Conditions
of growth.

¹ Cotton—Handbook of Commercial information for India.

The soil is another important factor. A rich well-drained salty soil capable of retaining moisture is ideal for it but it can be grown in poorer soils also. The bulk of India's product is obtained from the Deccan lavas region, that fertile tract of volcanic black earths and the adjoining territories. Another cotton belt of India stretches roughly from the U. P., to the Punjab where the soil is mainly alluvial. "The area under cotton covers such a wide climatic range that the season for planting and picking are divergent in different parts of the country and while in the Punjab and Sind, the crop is entirely irrigated, elsewhere it depends for the most part upon the sufficiency and the timeliness of the monsoon rainfall."¹ There are two varieties mainly cultivated namely *the early* and *the late*. The former grows mainly in Central and Northern India and the latter in Southern and Western India. Taking both the crops into consideration, the sowing season extends from March to August and the harvesting season from October to April. *The early* varieties take about 150 days and *the late* varieties about 240 days to ripen.

As a cotton-producing country India ranks next to the United States of America. The area under cotton in 1942-43 was estimated at 18,812,000 acres with a total output of 4,554,000 bales. Bombay, Central Provinces, the Punjab, Sind, Madras, the United Provinces, Bengal, Bihar and Assam are the important cotton-growing provinces within British India and among the states of India the principal producers are the Central India States, Baroda, Gwallior, Rajputana agency, Mysore and Hyderabad.

¹ Cotton—Handbook of Commercial information for India.

Area and Yield of Cotton in India

1942-43

Provinces	Area (in 1,000 acres)	Yield (in 1,000 bales)
Bombay	3,858	725
C. P. and Berar	3,209	529
Punjab	2,949	1,356
Madras	2,172	406
Sind	758	414
U. P.	317	92
Bengal	107	32
Bihar	41	8
Assam	31	10

Bombay has the largest acreage under cotton. It is grown mainly in Gujerat, Broach, Surat, East and West Khandesh, Nasik, Ahmednagar, Shiolapur, Dharwar and Belgaum. The states of Baroda, Sangli and Kolahpur are also important producers. In the Central Provinces the most important tracts are Berar, Nimar, Wardha and Nagpur. In *Madras* the districts of Bellary, Anantapur, Kurnool, Guntur, Tinnevely, Ramnad, Madura and Trichinopoly are the important growers of cotton. Cotton in the British *Punjab* is grown in four well-marked zones:—

Areas of
Production.

- (1) the canal colonies comprising the districts of Lyallpur, Montgomery, Jhang, Shahpur, Lahore, Gujranwalla etc,
- (2) the Western Punjab comprising of the districts of Multan, Mianwali, Dera Gazi Khan and Muzaffarnagar,
- (3) the Central and North Punjab comprising the districts of Amritsar, Jullundar, Hoshiarpur, Ludhiana, Sialkot, Jhelum, Rawalpindi, Attock, Gurudaspur and Kangra
- (4) The south-east Punjab comprising the districts of

the Committee have disposed of the suggestion on the grounds that sugar-cane is not a seasonable crop, and is easily perishable, moreover, the sugar requirements of the province would require only a small percentage of the total acreage now under jute.

Oil-Seeds: The trade in oilseeds is very recent in India. Oilseeds have demand not only for salads and food, but also for preparing medicines, perfumery, varnishes, lubricants, candle and soap manufactures and other purposes.

The principal oilseeds found in India are.—linseed, groundnuts, cotton-seeds, rape-seed, castor-seed, sesame-seed, and mowra-seed.

A large quantity is exported annually and the export of oilseed forms a large item in India's foreign trade. It is felt that India does not yet make the best use of her oilseed resources, though attempts have been made to develop a local oil-crushing industry. The total exports of oilseeds amounted to 703,000 tons valued at Rs. 9,99 lakhs in 1940-41. The exports in 1942-43 diminished further due to the dislocation of the oil crushing industry in Europe, as a result of the war.

Linseed is cultivated in Central Provinces, Bihar, Orissa, United Provinces, Bombay and Bengal. This is an winter crop being sown from August to October and harvested from January to April. A summer variety is also grown in Madras. India produces about 16 per cent, of the world's total output of linseed. In 1942-43, 3,408,000 acres under this crop produced about 411,000 tons. Practically the whole of the output is exported in normal times to the United Kingdom, France, Belgium, Italy and Holland. Indian linseed faces severe competition in Europe from Argentine linseed. The exports of linseed were valued at Rs. 400 lakhs in 1941-42 and Rs. 310 lakhs in 1942-43.

Groundnut is one of the most important oilseeds, and Groundnut has exhibited rapid growth within recent years. It is grown mostly in Madras, Bombay, C. P., the U. P., Mysore and Hyderabad. In 1942-43, 7,431,000 acres of land under this crop produced 2,714,000 tons. Exports of groundnut were valued at Rs. 4.96 lakhs in 1941-42 and Rs. 5.17 lakhs in 1942-43. Exports of groundnut oil were valued at Rs. 93 lakhs in 1941-42 and Rs. 42 lakhs in 1942-43. The principal buyers are France, Belgium, Austria, Hungary, Italy and United Kingdom. The chief ports of export are Madras and Bombay.

Sesamum is known to the trade as *til* or sesame. The cultivation extends to almost all the provinces of India but the crop is raised most extensively in Bombay, U. P., Bihar, Madras and in the Central Provinces. About one-fourth of the world's total output is raised in India. In 1942-43 India produced 463,000 tons of Sesamum and the exports were valued at Rs. 25 lakhs. The importing countries of Indian sesamum are Belgium, France, Germany, Italy, Egypt and the U. K. The Chinese competition is affecting India's trade in the seed.

Castor Seed: Castor oil plant is principally grown in Castor Seed Madras, Hyderabad State, Bombay and Central Provinces. It is largely exported and India commands a large share of the world's export trade in the seed. The total area under Castor Seed in 1942-43 was 1,352,000 acres and the total yield 147,000 tons. Castor oil is used in soap making as well as in medicine. It is now being used also as a lubricant. India is the chief source of supply. Export of castor seed in 1942-43 was valued at Rs. 60 lakhs.

Rape and Mustard Seed—It is mainly grown in northern Rape and India. The U. P., Bengal, Punjab, Bihar, Assam, Sind mustard and N. W. Frontier Province are the important producers seed.

than 5 inches of rain in one year, places in Assam occasionally get an annual rainfall of well over 400 inches. This mal-distribution of rainfall and the comparative dryness of the Indian soil make irrigation an essential requirement of agriculture in some parts of India.

There are three main types of irrigation works in India—(a) wells, (b) tanks and (c) canals.

Well-irrigation is very important in India, specially in areas not yet served by canals. About 25 per cent, of the irrigated area of India is well-irrigated. There are some places where the soil is apparently dry but contains water underneath. In those places it is profitable for the cultivators to bring up the water to the surface. Large tracts of the Punjab, the U. P., Madras, Bombay and Rajputana are irrigated by this process. Bullocks are often engaged to raise the water but the use of water-lifts and oil-engines is spreading rapidly. The digging of wells is not an expensive affair hence they are mostly private works.

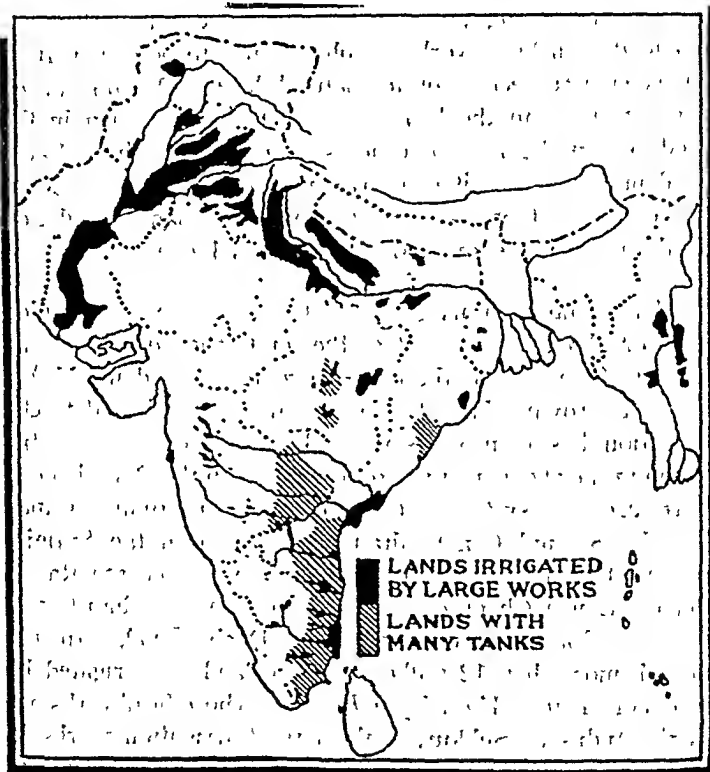
A *tank* is an artificial storage to collect rain water for irrigation when necessary. Large reservoirs, in the nature of artificial lakes by closing up natural valleys with huge dams, are constructed in which the rain water when it comes is stored. These are, however, liable to be dried up in the hot season. This system is prevalent in Madras, Mysore and Hyderabad. In Madras Presidency alone there are about 40,000 tanks serving between 3,000,000 to 3,500,000 acres of land.

But the most important means of irrigation are the *canals*. The irrigation-canals of India are of two distinct types, namely, those that are fed by rivers and those that derive water from artificial storage works. Where the rivers dry up for a part of the year as it largely is in the Deccan, it becomes necessary to store up water across valleys by

means of dams in the dry season and these are released through canals to irrigate the land. These are called *storage canals*. River canals are again of two types—*Storage Canals*. (1) the inundation canals, (2) the perennial canals. *Perennial canals* have water all the year round as they draw from rivers having permanent flow of water and they are provided with head-works enabling water to be drawn from the river irrespective of its natural level. *Perennial canals*. An *inundation canal* starts from the bank of a river so that when in the flood season the river overflows, water passes through the canal but otherwise it can have no supply of water. *Inundation canals*. Most of the canals at present are perennial and many inundation canals are being converted into perennial ones.

The total area irrigated in India is about 55 million acres or about 20 per cent of the total cropped area of the country. The Punjab, the United Provinces, Sind and N. W. Frontier Province have the largest areas of irrigated tracts. Irrigation has turned deserts and semi-deserts into fertile region in the above mentioned provinces. In the Punjab alone there are six systems: (a) the Western Jumna Canal, *Punjab*. (b) the Sirhind Canal (draining water from the Sutlej); (c) the Upper Bari Doab Canal (drawing from the Ravi), (d) the Lower Chenub Canal, (e) the Lower Jhelum Canal, (f) the Upper-Chenub-lower Bari Doab Canal. In the Punjab more than 12 million acres of land are irrigated by means of canals. The *Lloyds Barrage*, whose headworks are on the Indus at Sukkur, is the largest irrigation works in *Sind* India. This irrigates about 7.5 million acres of land in Sind. Irrigation is by means of seven large canals taking off above the barrage, three on the right bank and four on the left. In the U. P., more than 4 million acres of land are irrigated by means of canals. The *Sarda canal system* is the most important irrigation system of the U. P. It is U. P.

designed to irrigate Rohilkhand and the western portion of Oudh. The other canals in the U. P., are the Upper Ganges Canal, the Agra Canal, the lower Ganges Canal and the Eastern Jumna Canal. The Madras Presidency is



IRRIGATION IN INDIA

another province where canal-irrigation is important. Most of the canals are in the deltas on the east coast. The Mettur Dam across the Cauvery river irrigates about a million acres of rice fields in Cauvery delta. The Peryar Canal

system is also of great importance. In Madras about 8 million acres of land are irrigated of which nearly 4 million acres are canal-irrigated. The canal irrigation in other parts of India is not much important at present. In Bengal and Assam, canals are used for draining the low-lying areas and for navigation mainly, as these are areas of certain and heavy rainfall. In W. Bengal the Damodar River project is expected to irrigate an extensive area. In Bombay canals are of minor importance.

MINERAL RESOURCES

India possesses valuable minerals such as coal, iron, manganese etc., but the fullest use of them has not yet been made. Minerals are raised in this country mainly for export and for consumption within the country by direct processes, but very little has been done to develop those minerals that are associated with metallurgical and chemical industries. This is the chief cause of the predominance of foreign imports in the Indian market. The total value of ores, minerals and metals produced in India during 1938 was estimated at Rs. 341,395,000 as against Rs. 304,943,000 in 1937.

Coal is the most important mineral product of India. With the exception of the United Kingdom, India is the largest producer of coal within the British Empire. The Indian coal fields are classified according to two geological divisions, namely, the *Gondwana* coal fields and the *Tertiary* fields, the bulk of the coal fields belonging to the former class. More than 90 per cent. of the total coal output of India comes from the Gondwana fields. The *Jharia* in Bihar and the *Raneegunje* in Bengal are the two principal coal-fields and they contribute over 72 per cent of the total annual output of India. Next to them are the *Bokaro* and

Giridhi coal-fields of Bihar, *Pench Valley* coal-fields in the C. P., and *Singareni* coal-fields in the Hyderabad State. Of the tertiary deposits those at *Makum* in Assam and in the *Minwali* district of the Punjab are the most important. In 1939, nearly 25 million tons of coal were raised in India. The output increased to 29 million tons in 1940-41.

Output of Coal (in tons) 1939

Assam	..	..	284,541
Bengal	..	..	7,691,495
Bihar	..	..	14,786,392
C. P.	..	..	1,742,831
Punjab	..	..	174,080

India's Total .. 24,679,339

Coal in India is very unevenly distributed. The major coal-fields are located in the north-eastern part of the country. In the Peninsular India it is found only in a small quantity. The United Provinces and Sind are absolutely devoid of coal. The Indian coal-fields are neither near the coasts nor in the vicinity of industrial areas. This uneven distribution of coal, coupled with the high cost of railway transport, acts as a great handicap to the successful development of industries. Another defect of Indian coal lies in the fact that it is generally poorer in quality than foreign coal. So, we find that in spite of vast supply, India has to import a considerable quantity of coal from South Africa and England. This is because the imported coal contains greater fuel capacity and is of superior quality. Imported coal sells cheaper in Bombay, Madras and Karachi than Bengal or Bihar coal.

The best customer of Indian coal is the Railways. In fact, the coal industry of India owes its origin to the cons-

truction of the railways in the country. The iron and steel industry is the next biggest purchaser in the internal market and these two between them dispose of over 50 per cent of the total output of coal in the country. In normal times, a small quantity of Indian coal is exported to Hongkong, Trade. Ceylon, Straits Settlements, Phillipines and the U. K. But this overseas demand for Indian coal is on the decrease. In view of the general industrial improvement of the past few years, it is quite likely that internal demand for coal will increase greatly in the post-war period.

There is at present a great deal of wasteful and unscientific use of our coal-resources. Unless greatest care is taken for coal conservation, India is likely to face the prospect of a coal-famine in the near future.

Iron ore. India is only second to the United Kingdom in the British Empire as a producer of iron and steel. Though deposits of iron ore of good quality are found in many parts of India, the important areas are Singbhum in Bihar, Keonjhar, Bonai and the Mayurbhanj States of Areas. Orissa, "where recent discoveries include what appears to be a range of iron-ore running almost for forty miles." Iron-ore also occurs in the Chanda district of C. P., and in Bababudan hills in Mysore. Some districts of the Bombay Presidency and Madras Presidency have also deposits of iron-ore which remain little exploited still. The output of iron-ore in 1940 was nearly 2.8 million tons.

Manganese. This is a very valuable industrial mineral which has great demand in the heavy chemical, electrical and glass industries. India is the second largest producer of this mineral (after the U. S.) in the world. The mineral is widely distributed in the Deccan plateau. The principal manganese-producing areas are Central Provinces, Madras, Orissa, Mysore and Bombay

Attempts to extract aluminium from Indian bauxite have proved successful in recent years.

Copper. India is not very rich in copper. There is a copper belt in the district of Singbhum in Bihar, extending for about eighty miles.

Chromite. Mysore is the principal supplier, followed by Bihar (Singbhum) and Baluchistan.

Petroleum. India's petroleum production is small. It is found only at the two extreme corners of northern India—Assam and the Punjab. The two main oil areas of Assam are at Digboi and at the southern end of Khasia and Jaintia hills. The Punjab belt has only recently been tapped and the most important field is at Kanawar in the Attock district. The supply is quite inadequate to meet the home demand and nearly 300 million gallons of Petroleum are imported annually. The principal products of the Assam fields are petrol, jute-batching oil, lubricating oils, paraffin wax and low-grade kerosene. The paraffin wax is of excellent quality and is in much demand for export.

Other minerals found in India are salt, asbestos (Mysore, and Ajmere-Merwara), and Monazite (Travancore).

WATER POWER RESOURCES

India does not possess adequate supplies of coal and oil fuels. Moreover, Indian coal is of poor quality and unevenly distributed. But, there is immense possibility of harnessing water-power in India. Water power is a valuable natural resource in India. Heavy rainfall, rugged surface features to cause water to fall and regular and continuous flow of water are the three essential requirements for the generation of hydro-electricity. In the hilly areas and in the Deccan plateau electrification has extensive

possibilities. But the seasonal nature of rainfall in India causes much difficulty and necessitates construction of costly storage works. This increases the cost per unit of electricity produced. It is evident from a comparison of the position of India with other countries of the world, that the development of hydro-electricity in India is very unsatisfactory. While India is capable of producing 27 million h p, as against 43 million by Canada and 35 million by the U. S. A., the actual production of electricity in this country is much less than a million. This is largely due to the industrial backwardness of the country. The total energy generated in India in 1943 was 3,578 million kilowatt hours.

The first major hydro-electric installation in India was set up in the east of the Cauvery river in Mysore State in 1902 with the object of supplying power to the Kolar Gold fields. Since then extensions and improvements have taken place and power is transmitted to Bangalore and to many other towns of Mysore. The Tata Hydro-Electric Power Supply Co., was started in 1910 to supply electricity to Bombay. There are three power houses at Khopoli, Bhivpuri and Bhira. The installation at Bhira is the largest in the matter of output of power. The Khopoli power station was completed in 1914 and the Andhra Valley Power Co.'s station (Tata) at Bhivpuri was finished in 1922. The Bombay Textile Mills have been much benefitted by these Hydro-Electric undertakings, specially as coal is not available in the neighbourhood. The Pykara Hydro-Electric Works was completed in 1933. The Pykara river is one of the largest of the rivers draining the plateau of the Nilgiris. Its source is situated at an altitude of about 7,000 ft, on the slopes of the Mukurti Peak about 12 miles west of Ootacamund. The maximum output is expected to be 100,000 h p. The power is consumed in the textile, cement,

Important
Hydro-
electric
installations

tea and other cottage industries. Power is transmitted to Coimbatore and is passed on to Tiruppur and Jhena to Erode from where it is transmitted to Trichinopoly. Another important Hydro-Electric installation in the Madras Presidency is at Mettur Dam. The Mettur Lake has the largest capacity in India and the water is used both for irrigational and power purposes. It supplies power to Salem, Trichinopoly, Tanjore, North Arcot, South Arcot etc., and is linked with the Pykara works. The other important schemes in Madras are the Periyar and the Papanasham projects. The Pallivasal scheme in Travancore is also under development. Outside peninsular India, the oldest major electric installation is at Baramullah in Kashmir started about 1908. This is also known as the Jhelum power works and supplies energy to Srinagar. The Uhl River Electric Works, also known as the Mandi Scheme is the principal water power enterprise carried out by the Punjab Government. The head works and the generating station are in the Mandi State near Simla. The place is called Jogindur Nagar. Work began in 1928. Power is transmitted to Lahore, Amritsar and Ludhiana. In U. P., all the Ganges canal installations are interlinked and supply power to the U. P. Grid which is spread over 11,000 sq. miles extending from Hardwar in the North and Agra in the south and from Chapprauli in the west and Moradabad in the east. The main power house is at Bahadurabad. The Malakand project over the Swat river in the N. W. Frontier Province supplies power to Risalpur, Nowshera and Peshawar. The development of hydro-electric schemes in the Eastern part of Northern India is much less marked than the Western Zone. This area is rich in coal and mineral oil. So we find that Bengal and Assam in spite of having advantages for the development of hydro-electricity are slack in the matter, on account of the competition of coal. All round

the two Assam Valleys are high mountains and thousands of horse-power of potential hydro-electricity pour down these hills and mountains into the Brahmaputra, the Surma and the Barak, but they are not being exploited. The Bengal Government has plans and schemes for constructing dams and barrages across the Teesta river in the north and the Ganges and the Brahmaputra in the south. The Teesta Dam would pass water through many rivers of North Bengal into the Ganges. Another project is the Damodar Valley multipurpose development scheme. It is based on the construction of a series of dams on the upper Damodar and its tributaries in the Province of Behar. Besides irrigating many thousands of acres of land, this scheme is also expected to generate electrical power at various dam sites. The final aim is to link up this electric system in a grid of great size with the Sone Valley system and other power plants in W Bengal and Bihar.

Manufacturing Industries in India

India is now said to be the sixth industrial country of the world. The Indian factories to-day supply all the *sugar, cement and matches* required for home consumption. About 90 per cent of the *cotton textiles* consumed within the country is supplied by the mills in India. A large part of the home demand of *iron and steel goods, chemicals, paper* etc is also met by the Indian mills. But compared to agriculture, manufacturing industries in India, occupy a minor position as a means of livelihood. The total number of persons, so far employed in organized industrial establishments is still under 2 million. Industrial development in India has only touched the fringe of Indian economic life and its effect on employment and purchasing power has not been potent.

General
Survey

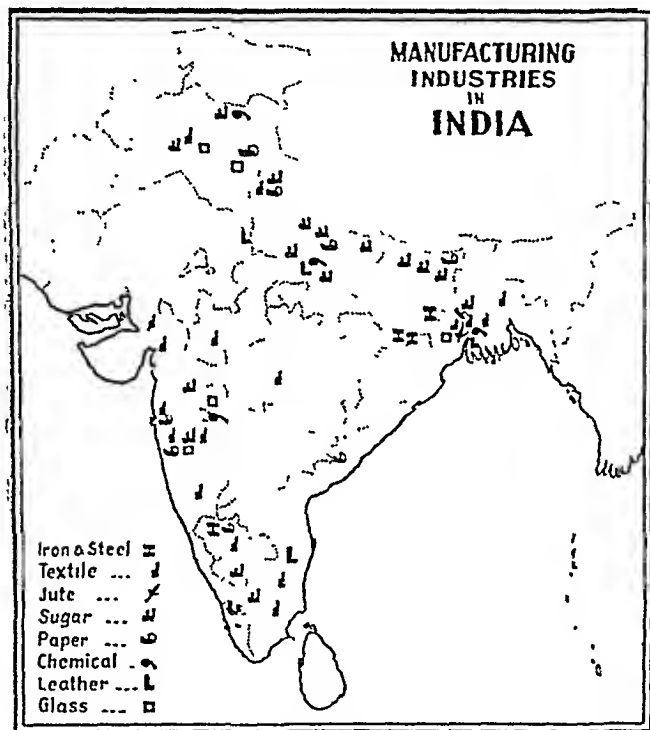
Another important feature of India's industrial development is the preponderance of foreign capital. The amount of foreign capital has been estimated to be £1000 to £1,500 million, most of which is British. In 1939 there were in India 9,422 large Industrial establishments, daily employing 1,940,477 workers.

Important Large Industrial Establishments in India (1939)

<i>Kind of Establishment</i>	<i>Number</i>	<i>Persons employed</i>
Cotton mills	389	480,450
Jute mills	105	308,715
Woollen mills	18	8,075
Silk factories	69	6,917
Iron and Steel Works ..	13	42,158
Sugar factories	175	79,078
Paper mills	12	8,095
Chemical factories	28	4,687
Match factories	118	16,363
Glass factories	63	7,997
Tanneries	39	6,216
Leathers and Shoes	12	6,510
Engineering	928	217,443
Others	7,453	747,874
Total ..	9,422	1,940,477

Of these large industrial establishments, 4085 (employing 368,905 persons) were seasonal and 5,337 (employing 1,571,572 persons) were perennial. Most of the large-scale manufacturing industries are located in or around Bombay, Calcutta and Madras, the chief ports of India. Machinery and stores from Europe and other continents can be conveniently brought here. Raw materials flow to these ports for export. The ports are also the centres of

business activities; hence banking facilities have grown up here. All possible economies in the buying of materials



and stores and in the marketing of products are made possible in these regions. But, recently the industries are showing a tendency towards decentralization and regional specialisation. The last great war also showed the usefulness of establishing industries away from the ports. Again, for a vast country like India, there is further need for decentralization of industries, if the industrial system is

to be put on a healthy basis. The housing problem is also very acute in the ports. Every effort should be made to decentralize the industries in future planning.

The real development of Indian industries began only after 1925, when the Government of India adopted the policy of discriminating protection. Before that, the Government of India had been following a policy of *Laissez faire* and did almost nothing towards the development of industries. It was during the World War I (1914-18), that the exigencies of the situation, made the Government and the business community feel the imperative necessity of industrial development of the country. The *Industrial Commission* was appointed in 1916 to enquire into the possibilities of industrialising the country. The Government accepted some of the recommendations of the Commission and appointed the *Tariff Board* in 1924. During the years that followed, rapid progress has been marked in the various large-scale industries. This rate of progress has been maintained and in some cases improved throughout the period of the World War II. Owing to the urgent need of iron and steel manufactured goods for the war, production of these articles had to be considerably expanded. The huge orders for sand-bags gave a busy time to the jute mills, while the demand for cotton textiles not only within the country but also in the neighbouring markets and the Eastern Group countries made textile mills work to their capacity. Efforts were also being made to produce various heavy chemicals in the country.

It is difficult to envisage the industrial position in the post-war period, but it can well be assumed that if a well-thought-out plan of development is not followed the position of some of the industries which have expanded their productive capacity during the period of war will be very difficult.

Indian industries may be divided into two classes—Classification
 (a) *Large-scale industries* with power-operated machinery carried on in factories of various sizes (b) *Cottage industries* carried on in the home of the workers themselves with hand-operated appliances. The National Planning Committee divide Indian industries into three classes: Cottage industries, small-scale (or medium sized) industries and large-scale industries. From very early days, the cottage industries were supplying the people, with all their requirements of manufactured goods. But most of the cottage industries of India are in a decaying condition at present. There is a need for reviving these small industries. Cottage industries.
 The progress of modern large-scale industry, however rapid, cannot possibly give full employment to the vast population of India. For the solution of unemployment problem in rural areas and also for supplementing the meagre income of the peasantry, the revival of the cottage industries is an urgent necessity. Small industry makes for equitable distribution of wealth. The development of cottage industries will also help the village communities in India to attain the maximum amount of self-sufficiency. The state should pay immediate attention to these decaying industries.

Cotton Industry—Cotton manufacturing industry is the most important industry of India. The first cotton mill in India, *viz*, the Bowreah Cotton Mill, was erected near Calcutta in Bengal in 1830. But at present Bombay is the principal seat of this industry in India, where the first industry was started in 1854. Since then the industry has experienced great development and expansion, in spite of occasional difficulties. At present there are 389 mills in India, giving employment to more than 480,450 persons. The cotton mill industry is almost entirely in Indian hands and financed by capital raised in India.

The amount of capital invested in this industry has been variously estimated at between 40 and 50 crores of Rupees. The greatest advantage possessed by the industry is the existence of a huge home market. The home demand is steadily increasing due to the growth of population and improved standard of living. The Industry received a great fillip during the First World War when the imports from U. K. declined. The '*Swadeshi movement*' after the war also helped the growth of the industry considerably. Then there ensued a period of great depression which was intensified as a result of the Japanese competition. *Protection* was given to the industry by the Government in 1931, but the measure failed to give adequate relief to the industry. However, the industry managed to survive the period of depression. It registered substantial progress during the second Global War. During the period 1939-44 the total production increased by over 17 per cent, in spite of serious difficulties such as the shortage of coal, lack of stores and spare parts, labour troubles, transport difficulties etc. At present nearly 400 crores of yards of cloth are produced by the mills in India for civilian consumption. The industry has a bright future. Given full employment and a balanced distribution of wealth the domestic market alone will be big enough for a marked expansion in the productive capacity of the industry. Moreover, India's geographical position is very favourable for the development of a substantial and permanent export to Middle East, China, S. E. Asia etc. The most urgent needs of the industry for planned post-war development are: (a) increase in home supply of long-stapled cotton, (b) production of textile machinery within the country, (c) technical education of workers and (d) research work.

Although the industry is said to be localised in the Bombay Presidency, Madras, Bengal and the United Provinces have also a number of big mills. The Seats of the industry.

Provincial Distribution of Factories (1943)

<i>Province</i>				<i>No of mills</i>
Ahmedabad	..	..	..	75
Bombay City and Islands	..	..	..	64
Bombay Presidency excluding the above	..	..	..	62
Madras Presidency	.	.	.	63
Bengal	..	..	..	33
The United Provinces	.	.	.	26
Central India	.	..	..	16
Central Provinces	..	.	..	8
The Punjab	.	.	..	7
Bihar	..	..	..	2
Others	..	..	..	33
India's Total	..	..	..	389

Bombay has several advantages over other provinces. It is situated very near the cotton-producing tracts of the Deccan and the port of Bombay attracts all the cotton crop of the black cotton soil for export purposes. So a special flow of raw material for the mills need not be created here. *Bombay Cotton Industry.* *Bombay* also has the advantage of cheap and abundant supply of hydro-electric power from the rapid streams of the Western Ghats and a sufficiently humid climate which favour cotton-spinning. *Bombay's* premier position is also due to its highly developed system of industrial finance and excellent communication facilities. At present *Bombay* and *Ahmedabad* between them contain more than half the total number of looms and spindles in India. *Ahmedabad* specialises in the manufacture of yarns of higher counts and in the weaving of fine cloths. Raw cotton for this purpose, is mainly imported from Egypt and the U S A. Other centres in the *Bombay Presidency* are *Sholapur*, *Surat*, *Broach* and *Jalgaon*.

Bengal was the home of India's textile industry before the advent of the British. But since the middle of the last century, she has lost her high position due to economic and political causes. In 1943 only 33 mills were working in this province. The market for cotton goods is vast in this province. She needs about 80 crores of yards of cotton cloth in order to clothe more than five crores of her population. Out of this the home production amounts to 15 crores of yards only, that is about a quarter of her requirements. For the remainder, she has to depend on manufactures from other provinces and abroad. Thus there is much room for expansion of this industry in this Province. In fact, Bengal also possesses many advantages for the development of cotton industry. The coal fields are in close proximity to the factory areas. Calcutta is a big money market and credit facilities are ample, though the industrial finance system is not as developed as that of Bombay. As regards raw material, cotton is grown in the *Mymensingh* and *Tipperah* district of E. Bengal and *Bankura* and *Birbhum* in W. Bengal. But the total production is not adequate enough to meet the demand for the increasing number of mills. Attempts should be made to increase the production of raw cotton within the province. Even if raw material is to be imported from other provinces, the disadvantage will be counterbalanced by advantages in other directions. In Bengal, the pressure on land is very high and the welfare of the people lies only in the development of industries within the province. The prospects of the cotton-manufacturing industry in the province seems to be very bright. At present the cotton mills are localised in the Hoogly basin within a radius of forty miles from Calcutta. *Naraingunje* in E. Bengal, equipped with facilities.

for quick transport, is also another important seat of cotton industry in Bengal. A few mills lie scattered in other parts of the province.

The growth of the cotton manufacturing industry in the *United Provinces* is due mainly to its excellent situation in the centre of India, commanding a large market and highly developed means of communication. Labourers are available in plenty and they are hardy and efficient. Raw cotton is grown all over the province specially in the districts of *Bulandsahar, Muttra, Aligarh* and *Agra*. Good quality cotton is obtained from the Punjab. Want of coal is a serious draw-back but now that hydro-electric schemes are projected and some completed the development of the industry will be easier. At present, *Cawnpore* is the most important seat of the cotton manufacturing industry in the U. P. Cotton carpets are manufactured at *Bareilly, Aligarh, Agra* and *Moradabad*. But more cotton mills may be opened in *Saharanpur, Aligarh, Hathras* and *Etwa*. These towns are situated in the cotton producing region and have the facilities of hydro-electric power and cheap transport. The last world war has given a great stimulus to the cotton industry of U. P. United Provinces.

Madras is the second largest cotton manufacturing province in India. *Coimbatore, Madura* and *Tinnevely* are the important seats of the cotton mill industry. *Madras* has specialised in the manufacture of high class cotton coatings, bleached shirtings, drills and khakis. Most of the mills are worked by hydro-electric power. The industry is located in the heart of cotton producing tracts. The quality of *Madras* cotton is also fairly good. About half the total crop of the province comes within the Lancashire definition of *long staple*. Madras. Other Centres.

The Central Provinces and Central India have a fair number of mills with scope for considerable development. *Nagpur* is the most important centre. Cotton-ginning and pressing is extensively carried on here. *Lyallpur* and *Ludhiana* are the important seats of cotton manufacturing industry in the *Punjab*. Carpets are manufactured at *Anurisar*. Many cotton mills are located in and around *Delhi*. However, the most remarkable development has been made in Indian states, where the rulers have given various forms of concessions in taxation etc. and where the labour laws are not very strict. Most of the mills produce coarse count yarn and cloth; but a few mills in Baroda state are specialising in fine count cloth and Indore mills are producing coloured goods. There are about 20 mills in Baroda and 7 mills in Indore. There are also a few mills in Mysore, Gwalior and Hyderabad States.

The *handloom industry* of India is another section of the Indian cotton industry. It is by far the most important cottage industry of India. According to a recent estimate India contains about 20 lakhs of handlooms, giving employment to about 27 lakhs of people* (1931 census). As regards the volume of output the handlooms produced in 1938-39, 170 crores of yards of cloth as against 391 crores of yards produced by the mills. The handlooms have been supplying about 30 per cent, of our cloth requirements. The demand arises principally from two quarters—(a) for highly artistic and finished goods and (b) for coarser goods needed by the village folk. So far as the distribution of handlooms is concerned, the position will be apparent from the following table

* The total no. of workers is about 60 lakhs if assistants and part-time workers are included

BRITISH INDIA

Provinces				No. of looms.
Ajmer-Merwara	..	..	..	1,600
Assam	..	..	..	124,000
Bengal	..	..	..	142,500
Bihar	..	..	..	103,100
Bombay	..	..	..	117,100
C. P. and Berar	..	..	..	73,300
Madras	..	..	..	340,500
N. W. F. Province	..	..	..	10,000
Orissa	..	..	..	48,000
Punjab	..	..	..	284,200
Sind	..	..	..	3,800
United Provinces	..	..	..	244,300
Delhi	..	..	..	500
STATES				
Baroda	..	..	..	10,200
Cochin	..	..	..	3,200
Gwalior	..	..	..	6,000
Hyderabad	..	..	..	114,500
Indore	..	..	..	1,000
Jammu and Kashmir	..	..	..	23,900
Mysore	..	..	..	50,000
Rajputana	..	..	..	89,000
Travancore	..	..	..	19,000
Kolhapur & Deccan States	..	..	..	15,000
Other States	..	..	..	70,000
Total	..	..	..	21,92,400

The most important point to be noticed in this connection is the pre-eminent position of Assam which is, perhaps, one of the least industrialized of the Provinces.

Handloom weaving is carried on in almost all the districts of Bengal. The best known centres are *Santipur* and *Dacca*. They are noted for the fineness and wonderful perfection of their products. *Tangail* in Mymensing district is noted for *Saries*. Roughly speaking, about 250,000 people are employed in the handloom weaving industry in Bengal. As an example of handloom weaving for export, the trade in *Madras* handkerchiefs may be cited, which are shipped to the United Kingdom, though their ultimate

destination is chiefly Africa¹ In fact, there is no part in India where this industry is not important. The Indian handloom industry has shown the most amazing vitality in face of severe competition from the mills. The great handicap of this industry lies in its lack of organisation. The chief means of improving the handloom industry suggested are. (a) spread of elementary and technical education among the weavers, (b) supply of cheap credit, (c) the use of improved equipments, (d) co-operation among weavers and (e) better marketing facilities

Domestic spinning is not of much importance now and the handloom weavers mainly depend on the mills for the supply of yarn. In this field, the cottage worker is unable to hold his own against the mills. The *charkha* movement of Mahatma Gandhi has given a stimulus to this industry. The work of the All-India Spinners' Association has been very useful. The report of 1940 indicates that 95,51,478 sq. yards of *khadi* were produced by 2,75,000 spinners and weavers scattered in over 13,450 villages

"But the mission of *khadi* is not merely to supply the towns people with fashionable *khadi* that will vie with the mill manufactures and, thus, like other industries, supply a few artisans with employment; but it is to become a supplementary industry to agriculture. In order that it may fulfil this mission it has to be self-sustained and its use must spread in the villages. Just as the villagers cook their own *roti* or rice, so must they make their own *khadi* for personal use. The surplus, if any, they may sell"¹

Jute Industry—The Jute and Cotton manufactures are outstanding examples of the progress of modern large-scale industry in India. The first Jute-spinning mill was

¹ Cotton—Handbook of Commercial Information for India

¹ Economics of Khadi, Page XIV of the introduction, quoted from S. Agarwalla's *The Gandhian Plan*

started at *Rishra* in Bengal in 1855. At present there are 105 Jute mills in India of which 96 are in Bengal alone. The Jute industry owes its origin mainly to European enterprise and capital and even now the majority of the mills are owned and managed by European companies. The Industry is highly localised in a small area around Calcutta on the bank of the Hoogly. The cultivation of raw jute is concentrated in the Ganges-Brahmaputra Delta in Bengal. This raw jute can be sent easily to Calcutta by the river or railway. The manufactured jute is easily shipped by boats to Calcutta by the mills for export. Coal is easily available from W. Bengal and Bihar. Facilities of finance and banking are readily available. Jute manufactures may be divided into four classes: (i) gunny bags used for packing rice, flour, oilseeds etc; (ii) gunny cloth or hessians used for baling cotton, wool and other fibres and bulky commodities; (iii) coarse carpets and (iv) cordage. Unlike cotton industry the Jute industry of India is essentially an export industry. Jute bags and cloth have a wide demand throughout the world. Many substitutes have been discovered in several parts of the world to replace jute as a sacking material. Paper bags and cotton bags are being used in a large scale in the U.S.A. Russian hemp is also trying to capture the market of jute. Jute bags in the U.S.A., and other countries are being displaced by the use of elevators and bulk-handling in transit in grain trade. But these substitutes have not so far met with any marked success. On the whole, the Jute industry in India has developed steadily. In 1880-84 the average value of jute manufactures exported by sea was only Rs 1.2 crores, whereas in 1928-29 (the year of record export) it rose to Rs. 56.9 crores. The World War I led to a considerable expansion and prosperity of the industry. But it was hit hard in the post-war depression period and the value of

Localisation
of Jute
Industry.

Trade.

exports declined to Rs 21·38 crores in 1933-34 followed by further decline till 1937-38. Although the World War II lifted the jute industry out of acute depression, the position of the industry even now is not very healthy. The industry depends too much on external demand. New uses for jute should be found out, so that its demands both internal and external, are increased. Only restriction of output will not help the industry in the long run. The Indian Central Jute Committee established in 1936, has undertaken research work in jute and jute products and they have an important task before them.

Woollen Industry—India is a tropical country and there is no wide demand for warm clothing within the country except in the North-West. The Woollen Industry in India is mainly a cottage industry producing carpets, *shawls*, blankets etc. Blanket weaving is carried on throughout India. "It is immune from the competition of machine-made goods, which cannot stand the rough wear to which the *kambli* is subjected."¹ This Industry has bright prospects provided its possibilities are systematically explored. Kashmir and Amritsar are noted for the manufacture of shawls of good quality. The wool for shawl making comes mainly from Tibet. The Industry is now in a decaying condition due to foreign competition. Carpet weaving is a very important cottage industry in India but it is now in a decaying condition on account of the ignorance and poverty of the weaver and the absence of organisation. The chief centres of the carpet industry are Amritsar and Multan in the Punjab, Jaipur and Bikaner in Rajputana and Agra and Mirzapore in the U. P. The bulk of the products are exported to foreign countries

¹ Jather and Beri—*Indian Economics*. Page 65

India has now 18 woollen mills and the most important Woollen centres of manufacture are Cawnpore, Dhariwal, Bangalore mills and Bombay. These mills use home-made wool mainly although it is short staple. For the manufacture of finer classes of goods, wool is imported from Australia and S. Africa. The scarcity of raw material of a good quality is an obstacle to the growth of the Industry.

Silk Industry—Silk is generally obtained in India from the cultivation of mulberry silk-worms. There are three principal areas where raw silk is found: (i) Southern portion of the Mysore plateau with Coimbatore district of Madras, (ii) The Murshidabad, Malda, Rajshahi and Birbhum districts of Bengal, (iii) Kashmir and Jammu with neighbouring districts of the Punjab and N. W. F. P. There is also a considerable cultivation in Chhota Nagpur and Orissa and parts of Central provinces of the Tasar silk-worm and in Assam of the Endi and Muga silk-worm. Silk is also obtained in North Bihar. Kashmir is the most important producer of silk in India. The mulberry trees are abundant and there silk-worms thrive best. Silk industry is a State monopoly there and the major portion of the products is exported to Europe.

Most of the raw silk is turned into finished product in India as a cottage industry. The chief silk weaving centres are Murshidabad, Malda, Rajshahi, Bishnupur and Bankura in Bengal; Bhagalpur in Bihar; Benares, and Mirzapur in the U. P.; Nagpur in the C. P.; Amritsar, Jullunder and Multan in the Punjab, Ahmedabad, Dharwar and Poona in Bombay, Bangalore in Mysore; Berhampur, Trichinopoly, Salem and Tanjore in Madras; and Srinagore in Kashmir. There are also power mills manufacturing silk goods in Bombay, Calcutta, Ahmedabad and Bangalore. In the early days of the East India Company silk was an important article of commerce, but its importance is now

rapidly declining. The exports of both raw and manufactured silk have been considerably decreased while imports are steadily increasing. The competition of Japan affected the silk industry of India greatly. The revival of the silk industry is possible only on a co-operative basis with the support of the Government.

Iron and Steel Industry in India—India is one of the largest producers of iron-ore in the British Empire. There is ample scope for the expansion of this industry at the present time. India has many advantages for developing iron and steel industry;—(1) large deposits are found in Singhbhum, Mayurbhanj, Keonjhar and other adjoining districts of Orissa and in the Chanda, Rajlhora and Drug districts of C. P. In Mysore large deposits of iron occur in the Bababudan hills. In Madras deposits of iron ore occur in Salem, (2) coal fields are not far from them generally but lack of coking coal has retarded the development of Salem and C. P. iron ore deposits, (3) limestone, dolomite and manganese sufficient for the purpose are found near by, (4) home market is large and expanding.

The earliest attempt to manufacture pig iron on modern lines was made as early as 1830 in the Madras Presidency. But the attempt was not successful. The first factory in India to show the commercial possibilities of successful extraction of iron was the Bengal Iron Co.'s Iron works at *Kulti* started in 1889. The establishment of Tata Iron and Steel works in 1907 by Mr. Jamshedji Tata at *Sakchi* marked a new era in the history of the industry. Since then, the industry has made phenomenal progress. The World War I (1914-18) gave an effective stimulus to the industry. The protection extended to industry since 1924 has contributed a great deal to the development of this industry. The progress of the industry is evident from the fact that while an average of 35,000 tons of pig iron

annually was manufactured in the earlier years of the present century, the total quantity of pig iron manufactured in 1939-40 rose to 1,837,600 tons. The quality of the product is also upto the continental standard. More than 50 per cent., of the output is absorbed by the steel industry in India. The manufacture of steel ingots also increased from 78,000 tons in 1913-14 to 1,018,000 tons in 1939-40. It is also noteworthy that the imports of foreign iron and steel into India came down from 608,000 tons in 1930-31 to 260,000 tons in 1939-40. The World War II (1939-45) again gave a fresh stimulus to the industry. The deterioration of the shipping situation and an increased war demand forced India to strive for a larger measure of self-sufficiency. As compared with the pre-war year 1938-39, the iron and steel production in India showed a substantial increase. The increase was 14 p.c., in the case of pig iron, 19 p.c., in the case of finished steel and 28 p.c., in the case of steel ingots¹. The Iron and Steel Industry is a 'key' industry and its national importance cannot be exaggerated. India is still dependent to a large extent upon foreign iron and steel in spite of her own increasing production. India's resources are sufficient to wipe out this huge import. Special types of steel for the engineering and machine tool manufacturing industries are yet to be made. Planned attempt in this direction is an urgent necessity. The future of this industry is very bright and it can be brighter still if it develops as a national industry.

There are now thirteen Iron and Steel mills and seventy-eight foundries employing about 150,000 workers. The *Tata Iron and Steel Co.'s works at Jamshedpore* is the greatest single works east of Suez. As has already been pointed out the company was floated in 1907 with purely

Tata
Works.

¹ Review of the Trade in India 1942-43

Indian capital, after the discovery of large deposits of high grade iron-ores in Mayurbhanj Estate by the late Sree Pramatha Nath Bose, an eminent geologist of India. Iron was made first in 1911 and mild steel two years later. The company owns valuable iron-ore concessions in the Mayurbhanj state in Orissa and the Raipur districts of C. P., manganese-ore deposits in the Balaghat districts of C. P., magnesite and chromite in Mysore and coal in the Jharia field. The Jamshedpore works is situated in a narrow valley formed by the rivers *Subarnarekha* and the *Khorkai*. Supply of water is obtained from these two rivers, but they are not navigable. The B. N. Railway serves the place and connects it with Bombay and Calcutta which are the biggest markets of iron and steel goods. The Iron ore and coal supplies are brought to the works by the branch lines of this railway. The labour force is recruited from the densely populated Ganges valley, mostly Bengal and Bihar.

A number of subsidiary industries have grown up round Jamshedpore. Of the various manufacturing companies mention may be made of the Tin Plate Company of India Ltd, The Indian Cable Co, The Indian Steel and Wire Products, The Tatanagar Chemical Company, The Tatanagar Iron Foundries and The Engineering and Machine Manufacturing Co. "Jamshedpore and the surrounding territory are thus developing into a veritable beehive of modern industries"

The second most important iron and steel manufacturing centre is in the neighbourhood of Asansol on the coal-fields. There are three concerns under the management of Messrs. Burn & Co. of Calcutta namely—*The Indian Iron and Steel Company at Kulti*, *The Steel Corporation of Bengal and Standard Wagons Ltd, at Hirapur*. Coal is obtained locally but limestone and iron-ore come from Orissa. The region

is served by the E. I. Ry., and is only 130 miles distant from Calcutta, which is the leading iron market in India. There is a net-work of branch lines connecting the B. N. Ry., to bring the raw materials. The water supply is obtained from the Damodar and the Barakar rivers.

The only iron smelting plant in South India is the *Mysore Iron Works* located at *Bhadravati*. The ore is ^{Mysore} mainly obtained from the mines in Bababudan Hills. It ^{Iron} is also well situated for manganese and limestone but no ^{Works} coal is available. Charcoal is used instead of coke in the blast furnaces. It is obtained by distillation of wood from the large forest areas in the neighbourhood. The works is situated on the river *Bhadra*, which supplies the water requirements of the industry. Labour is available in plenty. A *cement works* has been started here to utilize the *slag* (waste product). A *chemical industry* is also working to utilise the bye-products.

Two other works may be mentioned although they are not so important as the above mentioned works. The *United Steel Corporation of Asia* is located at *Monoharpur*. It draws iron-ore from *Konjhar* in Orissa. The *National Iron and Steel Co. Ltd.*, was floated in 1934, for the manufacture of mild steel rounds, bolts, nuts etc. Its factory is situated at *Belur* near Calcutta. Besides these many indigenous furnaces are working all over the country.

The Sugar Industry in India has developed within a very few years. A quarter of a century ago, India was ^{History.} an importer of sugar in large quantities. In 1931 the number of sugar factories in India was 31, while the number rose to 151 in 1945. *The protective import duty on foreign sugar has helped the growth of this industry to a great extent.* As a result of the recommendation of the Tariff Board, the industry was given protection in 1931, by the levy of a duty of Rs. 7-4 per cwt. on imported sugar. This

was for a period of seven years. *A fresh enquiry was held after March 1938*, and the Board recommended the continuance of the duty at the existing rate till the 31st of March, 1946. But the *government decided* that the duty should be reduced to Rs. 6-12-0 per cwt. and will be in force for two years only. The rate of protection for the rest of the period would be determined after further enquiry.

The important centres of sugar industry in India are at U. P., Bihar, Madras, Bombay and Bengal. The following table gives the production of sugar and the percentage of recovery obtained in each of the various Provinces and States during the seasons 1944-45 and 1943-44.

Provinces	Sugar produced in tons		Recovery of sugar per cent. cane.	
	1944-45	1943-44	1944-45	1943-44
Punjab, Sind and N.W.F. ..	12,300	17,400	9.83	9.99
U. P. ..	533,500	727,100	10.36	9.92
Bihar ..	170,600	212,400	10.70	10.53
Madras ..	53,300	39,200	9.26	9.32
Bombay ..	76,300	81,200	10.91	10.98
Bengal ..	12,000	13,600	9.75	7.73
Orissa ..	2,600	1,700	10.65	9.66
Indian States ..	124,500	123,800	9.85	9.83
Total	985,100	12,16,400	10.31	10.02

At present the sugar industry in our country, is localised in the United Provinces and Bihar. These two provinces produce roughly 85 per cent., of the Indian sugar. But according to eminent economists, the *localisation was mainly due to a desire to make quick profit, by taking advantage of the protective duty imposed on foreign sugar by the government.* The natural advantages that exist in these provinces *are not entirely of an ideal nature.* Bombay, Bengal and the Punjab have the same, if not better, advantages. As regards raw materials U. P. is very favourably situated. The irrigated lands of the United

Provinces have the largest acreage under sugar-cane being 2 million acres out of 3·27 million acres under sugar-cane in India. But there are some drawbacks in that there is very low yield per acre and that the sugar-cane produced is not of the best quality. However, these drawbacks can be remedied with improved method of cultivation. As far as the supply of power is concerned U. P., has got a very great advantage. It is in close proximity to the coal producing provinces namely Bengal, Bihar and Orissa. Labour is comparatively plentiful and is freely drawn from the densely populated rural districts of the province. The existence of comparatively satisfactory conditions has led to a more settled factory population here than elsewhere, and settled labour population is much more helpful to a industry than migratory efficient labour. Cawnpur which is an important railway junction in the U. P., holds a central position being situated half-way between Bombay and Calcutta and is a convenient manufacturing and distributing centre and the sugar of U. P., finds an useful outlet through Cawnpore. The other centres of sugar manufacturing in U. P., are Lucknow, Allahabad, Moradabad, Meerut, Rampur (State).

Bihar is the second largest sugar producing province in India. The industry is mainly localised in North Bihar although in recent years several mills have been started in South Bihar also. The districts of Saran, Champaran, Darbhanga and Muzaffarpur have the largest number of mills. The centres of the industry in S. Bihar are Bihta, Dehri-on-Sone, Buxar, Jammi etc. Bihar.

The position of *Bengal* in sugar production is unsatisfactory. But Bengal possesses certain natural advantages for the industry and the prospects of the industry in Bengal is very bright. Large areas in four out of five divisions of Bengal, are eminently suitable for growing Position in Bengal.

sugar-cane. Specially, *in view of the liberation of areas from jute, due to the restriction scheme sugar cane can be effectively used as a substitute for cultivation.* The quality of sugar-cane can be improved by introducing better seeds. *Bengal is one of the largest sugar-consuming provinces of India.* Against an annual demand of 60,00,000 mds., she produces only about 3,00,000 mds. of sugar and brings the remainder from the other provinces. As regards *capital and labour supply*, Bengal is *not placed in an inferior position* to the other provinces of India. The existence of the coal-fields is an additional advantage for Bengal. Bengal can take to sugar industry more earnestly, because as a highly protected industry it offers exceptional advantages.

Before the World War II, the sugar industry in India was faced with the problem of over-production. In April, 1937, an international Sugar Conference was held and the Government of India undertook not to export sugar by sea to any other country except Burma. This was against the interest of the home industry. The sugar industry had to pass through considerable stress and strain and various restrictive measures were adopted by the Governments of the two principal producing provinces to keep the prices of sugar steady. As a result of this and also of other factors, the production in 1941-42 fell and in 1942 prices of sugar rose very high. To check inordinate rise in prices the commodity was controlled. In 1942-43, it was decided that no restrictions should be imposed on the production of sugar as the demand for sugar had increased due to increased civilian and military consumption of the commodity. Moreover, the international Sugar Agreement of 1937 expired in 1942 and Indian sugar was demanded widely in the middle East and other neighbouring countries. As a result, production rose in subsequent years. The greatest problem of the industry is the reduction of the

cost of production which depends mainly on agricultural improvements.

The table given below indicates to some extent the effects of the vicissitudes to which the sugar industry in the world in general, and India in particular, was subjected during the war period.

Year	World production Tons	Indian production Tons
1938—39 (pre-war season) ..	26,685,000	765,000
1939—40 ..	30,446,000	1,398,400
1940—41 ..	29,897,000	1,268,900
1941—42 ..	19,225,000	941,900
1942—43 ..	17,828,000	1,294,700
1943—44 ..	19,460,000	1,216,886
1944—45 ..	19,143,000	968,130

India is now free to export sugar by sea. Indian sugar is in great demand in Ceylon, E. Africa, Iraq, Iran and other Middle East countries. The removal of the ban on Exports. exports will enable the industry to get a foothold in the neighbouring countries by taking advantage of the absence of competition from E. Indies. During 1942-43 exports of sugar from British India by sea amounted to 30,836 tons,¹ and the amount has increased during the subsequent years.

The bye-products of the Industry are not being properly utilised. Hopes about manufacturing power alcohol from molasses on a large scale, still remain unfulfilled. But production of rectified spirit has increased considerably in recent times. Researches are being carried on in the laboratories of the Imperial Institute of Sugar Technology to manufacture manure from molasses and filter cake.

Paper Industry—India commenced to produce machine-made paper from the beginning of the third quarter

¹ Review of the Trade of India 1942-43

of the last century, when at first a mill for the production of paper was started at Bally on the river Hoogly. After that it was found that India had potentialities in this direction and so a mill at Titaghar in 24 Pargannas of Bengal was started immediately after the establishment of Bally mill. After that a long time elapsed, but the improvement of this industry scarcely kept pace with the number of years. There were only 16 paper mills all over India in 1943. The development of this industry practically began in 1925, with the passing of the Bamboo Paper Industry Act (Protection) in that year. In 1939-40 the production of paper by Indian Mills was 70 thousand tons. The total tonnage that India consumes has been estimated at 401 thousand tons, and it has also been calculated that Indian Mills can, at their maximum capacity, produce nearly $\frac{1}{3}$ of the amount and for the remainder India has to look to the foreigners. Sabai grass is the chief raw material that is required for the making of paper, and in India this kind of grass grows abundantly in the northern part of the country. Rags, hemp, and jute waste are also the raw materials from which paper can be made, but this paper is inferior in quality. The Indian Paper Pulp Company does not use *sabai* grass, and the raw material that it depends upon for the production of paper is bamboo pulp. The yield of bamboo per acre is greater than *sabai* grass, at the same time the cost of production is cheaper. So this is an advantage. But the paper made from this pulp cannot be of decent quality. So India, though now she has gained a good position in the production, still depends on foreign countries for the finer quality. The demand for paper now is increasing, as Indians day by day are using fine papers more and more. Another disadvantage is the want of necessary chemicals like caustic soda, soda ash, bleaching powder and dyes which are not produced in the country in large quantities. Most of the

paper in India is produced in the province of Bengal, in the neighbourhood of Calcutta. Bombay comes next. The leading mills are (1) the Titaghar Paper Mills (Bengal), (2) Imperial Paper Mill (Kankinara, Bengal) now amalgamated with Titaghar Paper Mills, (3) The Bengal Paper Mill (Raneeganj, Bengal), (4) The Upper India Paper Mill (Lucknow), (5) Reay Mill (Poona), (6) Dalmia Paper Mills (Dehri-on-Sone, Bihar) etc. The average annual production at present is about 1,500,000 cwts. India does not produce any newsprint and is entirely dependent on imports. The Paper and Pulp section of the Forest Research Institute, Dehra Dun, is experimenting in this line.

Chemical Industry—The chemical industry is one of those industries which are considered the most vital key industries of a country, as it plays a very important part not only in the industrial advancement and economic life but also in the national defence of a country. Heavy chemicals especially sulphuric and hydrochloric acids, lime, caustic soda, sodium carbonate, nitric acid etc., are the essential requisites for many industries. So far, the Indian Chemical industries have shown indifferent progress, although supply of raw materials for some of the heavy chemicals is not lacking in the country. Sulphide ores, saltpetre, alum salts, lime stone, magnesium etc., are available in considerable quantities. Local manufacturing firms have so far confined their attention to a few *heavy chemicals* such as sulphuric acid, hydrochloric acid, nitric acid etc., which commodities are *naturally protected by the heavy sea-freights on acids*. Sulphuric acid is produced in large quantities. There is a heavy demand for it, specially in war time, for explosives. Pyrites from the Kumaon Hills and the Sahabad district of Behar are worked for sulphuric acid and have been found to be quite suitable for the purpose. As regards nitric acid,

the home production is still inadequate. In the matter of heavy chemicals, India has to face keen competition from foreign countries, Germany and the United Kingdom being the most serious rivals. Shortage of certain raw materials like sulphur, potassium compounds, sulphate of ammonia etc., lack of enterprise, want of special types of plants etc., are the causes of the poor progress of this industry. This industry has been given protection by the Govt. since 1931.

India is a large importer of chemicals, as is evident from the following figures:—

Imports into India of chemicals and preparation.

1936-37	1937-38	1938-39	1939-40
Rs 2,72,19,425	Rs. 3,32,82,055	Rs 3,05,87,150	Rs 4,51,76,166

The present war has slightly improved the outlook for this industry. The stoppage of imports from enemy countries, especially from Germany, and the intense war demand for chemicals have given a great push to this industry. But scarcity of raw materials, Government control over them and high prices thereof, to name only a few, are the difficulties which stare the industry in the face. At present the war boom has improved the position with regard to the supplies of important chemicals like sulphuric acid, chlor compounds, caustic soda, bleaching powder, soda ash, nitric acid, various other acids and many metallic compounds like aluminium sulphate. New plants have been established and existing factories have expanded their operations considerably. The Board of Scientific and Industrial Research is engaged in many research schemes. Yet, in spite of best efforts the country is experiencing 'a chemical famine' and many industries are seriously affected owing to the shortage of supplies.

of essential chemicals. A huge expansion is possible for this industry. Apart from heavy chemicals which are used in industries, we should not lose sight of *lighter chemicals and drugs* used in the pharmaceutical industry, in which direction there is ample scope for development. The war has brought forth immense possibilities for a proper and scientific development of the chemical industry in India and we hope that in the post-war period this development would continue in its onward march. But much will depend on the tariff policy of the Government of India.

Match Industry—This industry has made rapid progress in India as a result of the imposition of protective duty in 1922. Before 1921, there was no successful manufacture of matches on a commercial scale but at present there are about 118 factories giving employment to 16,363 people. The industry is now able to meet India's domestic requirements and imports of foreign made matches are now small. The Indian industry possesses two chief natural advantages, namely (1) large supply of cheap labour and (2) existence of a vast home market. The chief disadvantage is the high price of wood. Calcutta and Bombay are the two largest centres of match-manufacturing industry. Calcutta obtains its wood supply from the *Sunderbans*. Bombay has to depend on imported wood, which comes mainly from Finland and the U. S. S. R. *Simul*, *Mango*, *Genva* and *Salai* are the Indian woods used in the industry. There are also factories in other parts of India and in many native states.

Glass Industry—Glass making is a very ancient industry in India. But the manufacture of glass on modern lines is of very recent origin. There are at present two well-defined classes of the industry—(i) the cottage industry, (ii) the modern factory industry. The indigenous industry is found in many parts of India but the chief seat is in the

Present
position of
the match
industry.

Glass
industry.

Ferozabad district of the United Provinces. Bottles, bangles (*churi*) and inferior varieties of glass are manufactured. The industry suffered much as a result of Japanese competition in the past.

The factory industry is yet in a condition of infancy. At present more than 70 factories in India are able to meet about 50 per cent., of the annual home consumption. Most of the Indian glass works are small-sized ones. Although glass factories are scattered all over the country, the industry is largely concentrated in a few centres, mainly Western U. P., Calcutta and its suburbs and the Bombay area. The industry has got fresh stimulus from the last war (1939-45).

Ship-building Industry—For a long time, there has been a growing demand in India, for the establishment and development of a national *ship-building industry* on modern lines. India has a large volume of international, coastal and internal trade and she requires a large number of ships for the *carriage of her coastal, and over-seas trade as well as for traffic in inland waterways*. Moreover, India is surrounded by seas on three sides and she *needs her own ships for defence purposes*.

India possesses sufficient raw materials for this industry, and at the early stages, machineries may have to be imported. The ship-repairing yards may be conveniently used for ship-building purposes also. The harbours in India are also not at all unfit for this purpose. There is no want of labour in India and establishment of this industry will go rather a long way to solve the unemployment problem in the country. Indian capitalists are also eager to develop this industry. Thus it is evident, that there is a great deal of opportunity for the development of this industry in our country. But the indifferent and obstructive attitude of the government has been responsible, to a great extent, for the undeveloped state of this 'key industry'. The Indian

Mercantile Marine Committee recommended the grant of bounties and for the establishment of a ship-building industry in India. No action was, however, taken on these recommendations although the committee reported over twenty years ago. The last war gave a great stimulus to this industry in all parts of the empire, but the Government of India did not take any vigorous action in this direction. Calcutta possesses a natural advantage for the establishment of a ship-building yard, being in close proximity to raw materials and fuel. *The Scindia Steam Navigation Company*, in fitness of things, proposed to open a ship-building yard here. But being unable to obtain a site here, the promoters recently opened the yard at Vizagapatam, which port has also considerable natural advantages. Vizagapatam possesses a fine land-locked harbour with sufficient depth of water for the launching of large vessels. The port is situated between Calcutta and Madras, and thus it will be convenient for it to bring necessary raw materials from these two ports by means of sea carriage. Coal and iron ore are within easy reach of this port. It is the only shipyard in India designed and equipped to build sea-going vessels. This yard, when fully equipped, would be capable of building 16 ships annually. At present it mainly manufactures trawlers, launches and other smaller crafts.

Vizag
Yard.

Air-craft Industry—For the unification of huge land areas like India, the development of air transport is an indispensable necessity. Apart from military and defence requirements, the possibility of civil aviation in India is also great. Until recently, the Government of India did not favour the proposal of establishing an air-craft industry in India. Now, as a result of the last great war, the Government has taken up a scheme for the manufacture of air-crafts in India. But the possibilities of this industry are

Possibilities
of the
Industry.

very great in our country Aluminium is found in India in the Bihar plateau, Bombay Presidency and other places. Machineries and parts may be made in India very easily and even if they are not available at the initial stage they may be imported from abroad. Want of skilled labour is a handicap but that may be overcome at the beginning by the requisition of the services of foreign experts. Nowhere in the world, this industry is self-sufficient in every way.

The beginnings of an *aircraft industry* have now been established for the first time in India. The Hindustan Aircraft Ltd., was started at first as a commercial enterprise and the capital of the company was held jointly by the Government of India, the Mysore Government, and Mr. Walchand Hirachand and his associates. Afterwards the Government of India took it over for the improvement of production and management. The factory is still only an assembly plant working from imported parts and is likely to remain so for some time. It is, however, gradually training skilled labour for certain operations and may soon be in a position to undertake manufacture of certain types of components, in some cases from Indian materials. In 1941, the new factory is reported to have produced its first aircraft. It also carries out major repairs. Considering the importance of airships in the civilized world of the present day, India must build up her own full-fledged aeroplane manufacturing factories.

Automobile Industry—From an average of the imports for 10 years from 1929-30 to 1939-40, we find that India imports 20,000 motor vehicles valued at Rs 3.6 crores per annum. The supply is from foreign countries. The U. S. A., U. K., France etc., export motor vehicles to India. Many attempts have been made in India to manufacture motor cars. But want of necessary machineries, parts and materials and the indifferent attitude of the Government of

India have long stood in the way of the development of this industry. But it is now known that a company for the manufacture of motor vehicles has been started recently. India has a steady *home market*. The demand for motor vehicles is likely to increase during the post-war years. India is a land of *vast potential resources*. As regards iron and steel, aluminium, plywood and other raw materials there will be no want. Complex machineries and skilled technicians may have to be brought from foreign countries at first but it can be safely said that our boys will achieve the standard of skill required after a few years of experience. Of course the first few years will be very difficult ones but that need not discourage us.

Leather Industry—This industry includes collection and curing of hides and skins, tanning, manufacture of leather, foot-wear and leather goods besides footwear. India possesses a large supply of hides and skins. Indigenous tanning industry has been in existence within the country from a very long time but the indigenous types of goods now-a-days are not very popular. Although the industry on modern lines was started as early as 1860, it has not been able to make considerable progress because of caste prejudices, lack of proper training and want of capital and organisation. The Great World War of 1914-18 helped the progress of the industry to a great extent. The industry was given protection in 1919 to develop the tanning industry within the empire. The protection having failed considerably to achieve its objects was abandoned in 1927. However, the industry is progressing slowly. In 1939-40 there were 39 tanneries in India employing 6,216 persons. Cawnpore, Agra, Delhi and Calcutta are the chief centres in N India. In S. India Madras is the most important centre. India has a large supply of hides and skins and tanning materials are available in large quantities.

Present position of the Tanning industry.

from our forests. The prejudices which were once felt against the industry are gradually disappearing and people of orthodox communities even are being attracted towards it. The industry also expanded during the last great war of 1939-45 to meet the increased military requirements. The industry may well look forward to a bright post-war future.

The Cement Industry—Although the demand for cement exceeds 1,000,000 tons a year in India, the cement industry occupied an insignificant position before 1914. The country had to depend mainly on foreign cement. But the industry has made rapid strides during the last twenty years. The country has now become almost self-sufficient in this respect. The quality is also not inferior to foreign products. The industry developed as a result of government patronage during the two World Wars. The total production in 1940 was about 1,186,000 tons. The important cement works are:—Indian Cement Company (Kathiwar), Katni Cement and Industrial Company (C. P.), Bundi Cement Co. (Rajputana), Dalmia Cement Ltd. (Dehri-on-Sone), Mysore Cement Works (Bhadravati) etc. etc. The Indian Cement Industry possesses natural advantages in respect of raw materials but suffers from want of fuel as most of the factories are situated away from the coal fields.

Brass and Bell-metal Industry—Manufacture of brass and bell-metal utensils is an important cottage industry in India. This industry has not to face any direct foreign competition, although an indirect competition in the shape of aluminium and enamelled iron wares exist. Indians use large number of these utensils and vessels in their daily lives. This industry is carried on mainly in the districts of Benarès, Mirzapore, Lucknow, Moradabad, Madura, Mysore, Murshidabad, Midnapur, Bankura, Malda, Rajshahi, Dacca

and Mymensing. The products of *Khagra* in Murshidabad are noted for their wonderful artistic designs.

COMMUNICATION SYSTEM

The importance of all forms of transport in all spheres of modern life, especially the industrial and commercial, can hardly be overestimated. Progress has been most rapid and profitable where transport facilities have been highly developed. Transport has been a major problem in a vast sub-continent like India, throughout her whole history. Even now the means of communication in India is defective. The distances to be covered are tremendous, the natural hindrances formidable and in many parts the climate quite unfavourable. Hence to provide the whole of the country with an up-to-date system of transport is a huge task entailing the expenditure of an enormous sum of money. Northern India has a better system of transport as it is mostly a plain and has rivers which are navigable to a great extent.

The main lines of communication in India are found in *railways, rivers, roads and airways*.

Railways—Railways are the most important of all the means of communication in India. Ordinarily, railways were built up in India for military purposes. The frequent visits of famine necessitated the extension of railways. At present the railway mileage of India exceeds 41,000 miles. In a country like India, which is more or less like a continent, the railways have brought about an equalisation of prices throughout the country. The rapid industrialisation of the country is largely due to the railway development. It has fostered agricultural production and encouraged the establishment of large industries. It has brought about a sense of unity in the country.

India requires more railway mileage. In comparison with U. S. A., Canada and England, India is lagging behind in railway extension.

The Chief Railways of India are:—

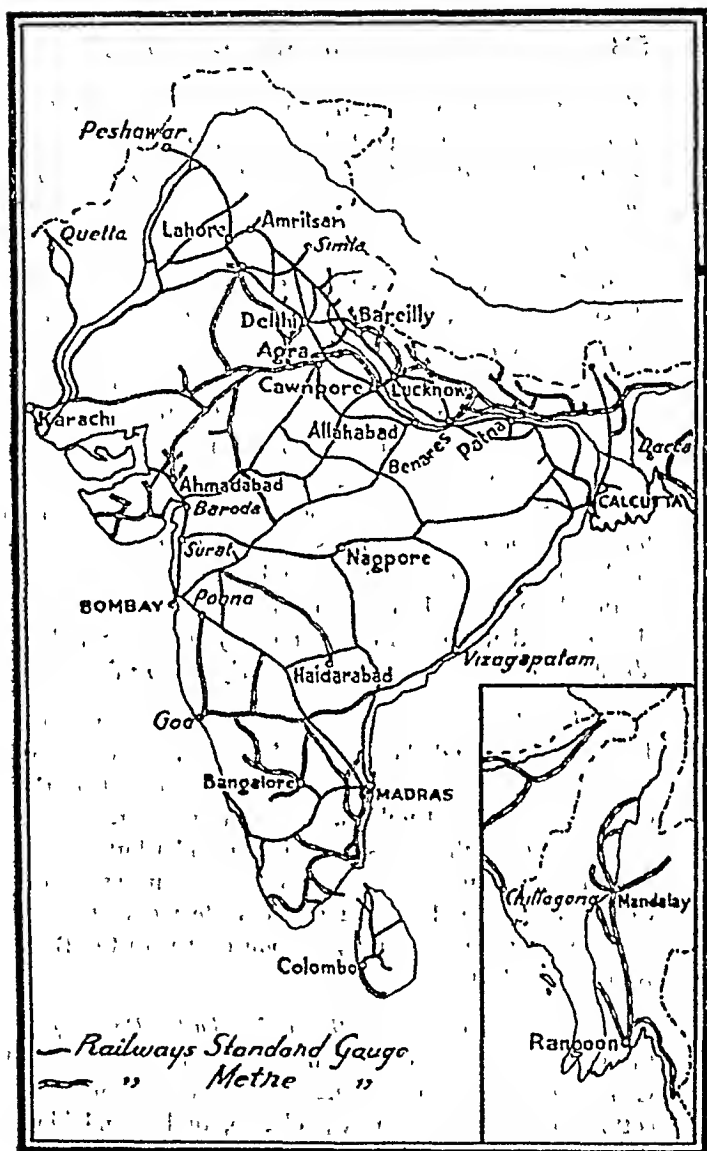
- (1) Bengal & North Western Railway.
- (2) Bombay, Baroda & Central India Railway.
- (3) Bengal Nagpur Railway.
- (4) Bengal and Assam Railway.
- (5) East Indian Railway.
- (6) Great Indian Peninsular Railway.
- (7) Madras & Southern Marhatta Railway.
- (8) North Western Railway.
- (9) The South Indian Railway.
- (10) The Indian States Railway.

The Bengal & North Western Railway is more than 2,033 miles in length. It is connected with Bengal & Assam Railway at Katihar and the East Indian Railway at Benares. It serves the Northern side of Bihar and U.P. and handles coolie traffic largely.

The Bengal Nagpur Railway. It has two lines of which one runs from Calcutta to Waltair and the other from Calcutta to Nagpur. It shares with the E. I. Rly., much of the coal traffic of the country. The total mileage is over 3,000.

The Bombay, Baroda & Central India Railway. It connects Baroda and Rajputana with Delhi and Agra. A line also goes to Bombay. It is nearly 4,000 miles long.

The East Indian Railway. It is the most important railway system which runs from Calcutta to Delhi where it meets the North Western Railway, and thus provides the Grand Trunk route from Calcutta to Peshawar. It serves the fertile Gangetic valley and handles jute, mica, coal,



PRINCIPAL RAILWAYS OF INDIA WITH MAJOR PORTS
AND TRADE CENTRES

distances, but to provide a properly co-ordinated supplement to railway transportation.

The inland waterways of India are mostly provided by the three great rivers—the Indus, the Ganges and the Brahmaputra. These three great river systems permit 26,000 miles of navigation.

The Indus, the Ganges and the Brahmaputra are navigable by steamers all the year round or for the greater part of the year, for hundreds of miles above their mouths. The Indus is navigable as high as Dera Ismail Khan in the North-Western Frontier Province, 800 miles inland. Its tributaries are open to small crafts all the year round. The Ganges is navigable as high as Cawnpore and steamers pass up the Gogra as far as Fyzabad. The Brahmaputra is navigable by steamer as high as Dibrugarh and there is steam navigation on its tributary the Surma, as far inland as Sylhet and Kachar. The Hoogly on which Calcutta is situated, is navigable all the year round upto Nadia and further up from July to October. In Eastern Bengal and the deltas of the east there are neither good roads nor an efficient and adequate Railway system, hence navigation is the only available means of transport. There are also innumerable canals, creeks and backwaters affording facilities for water transport. The rivers of Southern India are not very suitable as waterways. During the rainy season they are in flood and again in summer they are reduced to mere pools, making navigation impracticable. The Mahanadi, Godavari and Krishna are navigable in their upper courses but the traffic on them is not very considerable. Most of the irrigation canals of southern India are not suitable for navigation as they are usually shallow and pass through sparsely populated regions. The most important navigation canal is the Buckingham Canal in Madras.

Airways—Aviation itself is of very recent origin and specially so in India where it has been started seriously a few years ago. India has a great advantage in air transport because it is a plain land and no large mountains or adverse ocean currents offer any hindrance. For transport and defence purposes aeroplanes are of great value but they are also important for commercial transport of light but valuable goods. India is a country whose balance of trade is in most cases in her favour. So large quantities of export bills are drawn in India which require to be communicated soon. Aviation will facilitate presentation of such bills. Businessmen may travel very rapidly by air and thus trade facilities will be enhanced. All the important ports of India are well connected by railways so that goods brought by air can be sent immediately to the interiormost parts even. There is a growing organisation of the trunk air lines in India. The mileage of regular air-routes in India is about 6,500. The Government of India has planned an air-route mileage of 11,000 miles in the post-war period. "The establishment of daily air-services on the main trunk air-routes covering India north to south and east to west, with link routes connecting the trunk routes at suitable points and with extensions to the capitals of adjacent countries is contemplated in the plan of post-war civil aviation of India." Karachi is now the principal air port of India. There are regular air-services for mails and passengers between Karachi-Colombo, Karachi-Lahore-Delhi, Bombay-Delhi, Karachi-Calcutta, Bombay-Kathiwar, Bombay-Kolapur etc. If India is to build an efficient air transport in the country the development of air-craft industry is essential. Indian aviation must be backed by a manufacturing industry of her own if it were to fulfil its mission in India i.e., unifying the vast country by developing rapidly the backward areas.

Distribution of Population.

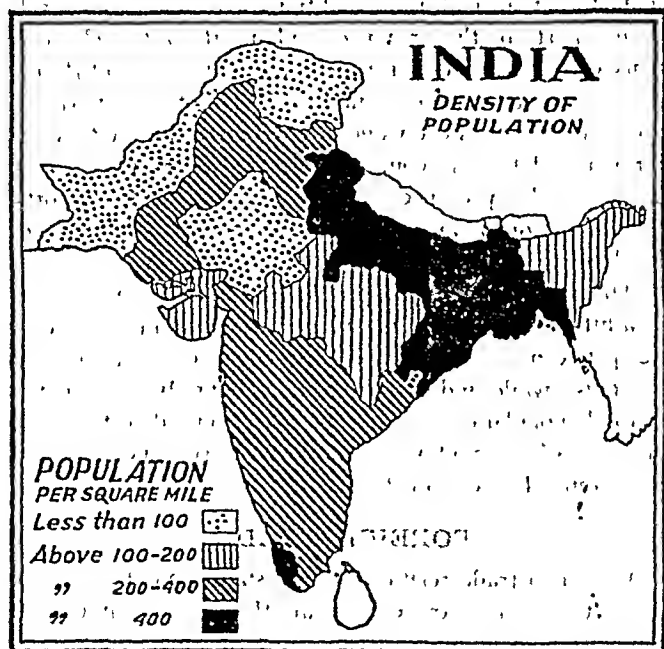
According to the Census of 1941, the population in India is 388,997,955 which represents an increase of 14·7 per cent., over 1931 and of 39·1 per cent., over 1891. 200·9 millions are male and 187·9 female. India is one of the most densely populated countries of the world. The density of population in India is 246 per sq. mile, that of British India being 341 and the Indian States 130. The density of population, according to 1941 census, in Indian Provinces and in principal Indian States are given below:—

INDIA	246 per sq. mile.		
Provinces	341 " " " "		
States & Agencies	130 " " " "		
<i>Provinces</i>	<i>Density</i>	<i>States & Agencies</i>	<i>Density</i>
	<i>per sq. mile</i>		<i>per sq. mile</i>
Madras	391	Central India	144
Bombay	272	Cochin	953
Bengal	779	Deccan (& Kolhapur)	257
U. P.	518	Gujerat	198
Punjab	287	Gwalior	154
Bihar	521	Hyderabad	198
C. P. & Berar	170	Kashmer & Feudatories	49
N.W.F.P.	213	Mysore	249
Orissa	271	Punjab	144
Sind	94	Rajputana	103
Ajmer-Merwara	243	Travancore	792
Coorg	106	U. P.	528
Delhi	1,599	Western India	129

Referring to the *distribution of population in India*, Mr Stamp, says, "The distribution illustrates extraordinarily well the influence of Geographical factors." The average density of India, at the present moment, is estimated at about 246 per square mile. But the distribution of population is not uniform. Density of population varies extraordinarily in different parts of the country. It is as high as 779 per sq. mile in Bengal and as low as 9 in Baluchistan.

¹ From *Nalanda Year Book*, 1943

(according to the census of 1941). This uneven distribution of population is mainly due to the following factors—rainfall, climate, soil, facilities for irrigation etc. India is essentially an agricultural country. Hence, the provinces having the best facilities of cultivation have attracted the largest number of people, in general. The population is



densest where agriculture is most important. The provinces of Bengal and Bihar have a very high density because the soil is fertile, the rainfall sufficient and the climate healthy. The level character of the land is also a great attraction. Besides, there are many industrial and mining concerns in these provinces and people from other provinces have settled

	1940-41	1941-42	1942-43	Percentage on total exports of merchandise in 1942-43
Fish (excluding canned fish)	63,15	60,19	78,29	0.42
Oilcakes	84,16	37,44	61,49	0.33
Provisions and oilman's stores	73,08	79,36	59,92	0.32
Coffee	24,14	40,41	52,38	0.28
Hemp, raw	76,28	96,53	52,37	0.28
Apparel	18,45	26,85	43,72	0.23
Rubber, raw	91,89	72,77	6,26	0.03
" manufactures	41,14	47,26	30,87	0.16
Coal and Coke	1,90,05	1,55,26	35,61	0.19
Gums and resins	25,19	52,27	34,49	0.18
Drugs and medicines	33,55	60,98	30,58	0.16
Dyeing and tanning substances	40,99	36,33	30,58	0.16
Manures	45,64	27,96	29,51	0.16
Soap	25,14	35,41	26,65	0.14
Silk, raw and manufactured	5,13	12,11	24,12	0.13
Paraffin wax	35,56	14,04	21,31	0.11
Instruments, apparatus, etc.	32,79	44,79	19,39	0.10
Building and engineering materials other than of iron, steel or wood	63,42	68,20	18,46	0.10
Bristles	23,52	25,11	17,23	0.09
Fibre for brushes and brooms	10,91	8,29	17,15	0.09
Animals, living	7,18	8,18	15,49	0.08
Wood and timber	25,36	21,53	14,95	0.07
Saltpetre	24,27	23,11	14,06	0.07
Bones for manufacturing purposes	11,72	12,24	12,22	0.07
Boots and shoes	49,64	47,70	11,29	0.06
Cordage and rope	11,73	14,96	6,34	0.03
Paints and painters' materials	21,58	23,16	5,46	0.03
Books, printed, etc.	11,25	9,11	4,39	0.02
Toys and requisites for games, etc.	11,90	9,93	3,97	0.02
Paper and pasteboard	31,55	29,81	3,20	0.02
All other articles	4,76,84	7,52,51	4,79,31	2.63
Total Value of Exports	86,88,03	237,55,27	187,63,37	100

Imports of Merchandise¹

The following table shows the comparative importance of the principal articles imported into British India:—

Imports.

(In thousands of Rupees)

	1940-41	1941-42	1942-43	Percentage on total imports of merchandise in 1942-43
Oils	21,03,40	21,75,68	27,78,68	25.15
Cotton and cotton goods	20,78,67	22,14,08	16,78,52	15.19
Machinery and millwork	11,15,17	12,82,29	10,03,24	9.08
Metals and ores	11,89,01	12,80,28	6,15,58	5.57
Vehicles	6,81,61	13,03,49	5,71,18	5.17
Chemicals	5,55,99	5,46,64	4,67,29	4.23
Dyeing and tanning substances	5,30,14	5,77,65	4,63,90	4.20
Wool, raw and manufactured	4,28,37	4,69,98	3,78,16	3.42
Instruments, apparatus and appliances	4,98,52	5,14,10	3,33,42	3.02
Paper and pasteboard	3,94,36	3,54,73	1,82,12	1.65
Spices	2,19,15	2,21,03	1,51,72	1.37
Liquors	1,99,20	2,70,94	1,48,36	1.34
Drugs and medicines	2,18,69	2,78,64	1,46,95	1.33
Tobacco	1,33,95	2,51,71	1,33,19	1.21
Fruits and vegetables	1,02,15	1,12,08	1,11,56	1.01
Hardware	2,07,10	2,18,24	1,00,61	0.91
Building and engineering materials	66,53	86,32	97,45	0.88
Salt	47,72	98,02	88,72	0.80
Paints and painters' materials	1,03,16	1,14,22	79,28	0.72
Tea chests	1,34,40	1,22,25	79,19	0.72
Provisions and oilman's stores	2,26,01	2,55,75	70,86	0.64
Bobbins	47,90	64,63	56,54	0.51
Precious stones and pearls, unset	29,81	21,67	55,73	0.50
Tea	12,59	11,98	51,74	0.47

¹ Review of the Trade of India 1941-42 and 1942-43.

	1940-41	1941-42	1942-43	Percentage on total imports of merchandise in 1942-43
Belting for machinery ..	62.25	67.66	47.82	0.43
Clocks and watches and parts ..	26.11	26.62	39.63	0.36
Toilet requisites ..	56.76	88.17	38.10	0.34
Arms, ammunition and military stores ..	48.44	48.60	37.60	0.34
Tallow and stearine ..	24.94	50.04	34.90	0.32
Stationery ..	56.98	51.33	33.40	0.30
Grain, pulse and flour ..	14,34.85	15,02.03	30.85	0.28
Glass and glassware ..	86.26	65.55	25.64	0.23
Gums and resins ..	26.65	32.39	27.29	0.25
Books, printed, etc ..	41.32	40.21	23.58	0.21
Artificial silk ..	5,44.36	3,48.97	23.05	0.21
Wood and timber ..	2,89.30	2,86.96	20.43	0.18
Rubber manufactures ..	1,56.00	1,55.31	18.52	0.17
Cutlery ..	20.93	21.09	12.77	0.12
Flax, raw and manufac- tured ..	16.39	17.74	11.87	0.11
Earthenware and porce- lain ..	30.42	35.12	10.73	0.10
Apparel ..	34.36	28.42	9.99	0.09
Manures ..	79.67	17.76	7.25	0.07
Haberdashery and mill- nery ..	41.02	28.73	5.96	0.05
Soap ..	18.39	20.88	5.95	0.05
Toys and requisites for games ..	19.83	15.22	4.53	0.04
Jewellery, also plate of gold and silver ..	4.25	3.15	4.13	0.04
Animals, living ..	5.69	2.42	3.70	0.03
Jute and jute goods ..	9.93	6.56	3.49	0.03
Silk, raw and manufac- tured ..	1,71.75	1,49.08	2.98	0.03
Paper making materials ..	12.69	11.24	2.75	0.02
Furniture and cabinet- ware ..	12.69	4.84	2.32	0.02
Boots and shoes ..	3.05	3.73	2.02	0.02
Fish (excluding canned fish) ..	6.61	6.24	1.90	0.02
Sugar ..	36.10	1,07.54	1.87	0.02
All other articles ..	9,95.22	12,24.89	7,10.75	6.43
Total value of imports ..	156,96.81	173,14.89	110,49.76	100

It will be seen from the above table that jute and cotton are the most important of the commodities exported in value. The other most important articles are tea; oil-seeds; leather; metals and ores; grain, pulses and flour; raw hides and skins; lac; wool, tobacco; and the remaining articles are comparatively unimportant.

A change in the character and volume of trade took place during the World War II due to the closing of certain important markets and the want of freight space. In the year 1938-39, raw materials formed about 50 per cent, of the total exports, whereas in 1942-43 they were about 22 per cent. Manufactures took a larger share in the total exports. This was due to demand for military equipments in the Middle East, where it was difficult to obtain supply from western countries. This has given a definite stimulus to industrialisation in India. Specially, the temporary disappearance of Japan and Germany in the Asiatic markets, will give a wide scope to India to expand and develop her trade with all Asiatic countries.

On the Import side oils hold at present the first position. Next in importance are cotton and cotton goods; machinery and mill work; metals and ores; vehicles; and chemicals. With the separation of Burma oil has come to occupy the leading position among the imports of India. The same factor explains the importance of rice in India's import trade. It is to be noted here that while the imports consist of a wide range of articles, the export trade is restricted to a comparatively fewer number of commodities.

Entrepot (Re-exports) trade of India—From a very ancient time India acted as a distributing centre for many of the Asiatic countries. Even now, India has a large volume of Entrepot trade and many of her exports consist of the re-exports of articles previously imported. Being situated in the centre of the Eastern Hemisphere, she is

Exports
trade

eminently suited to act as a convenient distributing centre, particularly for those Asiatic countries which have no sea-board of their own. The re-export trade is mainly in manufactured articles imported from Europe and America. The chief articles are *textiles, raw wool, manufactured tobacco, vehicles, and machinery*. The total value of re-export trade was Rs. 15,33 lakhs in 1941-42 and Rs. 7,07 lakhs in 1942-43. The percentage shares of the principal countries in the re-export trade of India in the year 1942-43 were as follows—The U. S. A. 28 p.c.; Iraq; 13 p.c.; the U. K. 9 p.c.; Ceylon 5 p.c.; and Aden, Palestine, Syria, Muskat, Ornam and Saudi Arabia 3 p.c., each. The bulk of the trade passed through Bombay and Karachi.

The Direction of Overseas Trade.

The following tables show the percentage shares of foreign countries in India's export and import trade:—

Exports (excluding re-exports)

Countries	1939-40	1940-41	1941-42	1942-43
	Per cent	Per cent	Per cent	Per cent
United Kingdom	35.5	34.7	32.3	30.5
United States of America	12.0	2.0	19.6	14.8
Iran, Arabia, Iraq, Asiatic				
Turkey and Bahrein Islands	2.7	1.6	3.2	9.3
Australia	2.1	3.9	5.2	8.6
Ceylon	3.3	3.9	4.1	7.7
Union of South Africa	2.1	1.6	2.5	5.6
Canada	1.5	1.7	2.7	2.1
Argentina	1.7	2.2	2.4	1.4
Burma	6.9	8.7	4.9	
Japan	6.3	4.8	1.9	
China	4.0	5.3	0.9	
France	1.2	2.4		

Imports.

Countries	1939-40	1940-41	1941-42	1942-43
	Per cent	Per cent	Per cent	Per cent
United Kingdom ..	25.2	22.9	21.1	26.8
United States of America ..	9.0	17.2	20.0	20.2
Burma	19.0	18.2	17.0	..
Japan	11.7	13.7	6.8	..
Iran, Arabia, Iraq, Asiatic				
Turkey and Sumatra ..	2.9	3.2	4.4	4.3
Kenya and Zanzibar ..	2.1	2.3	4.2	5.0
Canada	0.8	1.9	3.9	7.4
Straits Settlements ..	2.9	3.4	3.1	..
Australia	1.4	1.6	2.9	4.9
Ceylon	0.9	1.4	2.0	2.0
China	1.6	1.8	1.6	1.3
Java	2.0	0.5	1.1	..
Switzerland ..	1.1	0.8	1.0	1.1
Union of South Africa ..	0.4	0.5	0.7	2.9
Belgium	1.5	0.6	..	..
France	0.9	0.4	..	..
Netherlands	0.9	0.3	..	..
Italy	1.2	0.3	..	..
Germany	4.2	0.1	..	..

From the above tables it is evident that the United Kingdom has a pre-dominant share in India's foreign trade. But since the World War I, there began a tendency for both the import and export trade to be diverted from the United Kingdom to other countries. In the early years of the present century the U. K., supplied as much as 65 p.c., of the Indian imports and took about 30 p.c., of the total Indian exports. But at present India exports more to U. K. than she imports from the U. K. The result is that the balance of trade is growing more and more in India's favour. As a result of last war's purchases, India has become a creditor of the U. K., and has accumulated large *sterling balances* held in London in the name of the Reserve Bank of India. The commodities exported to the U. K.,

Trade
with the
U.K.

are *tea, jute (raw and manufactured) oil-seeds, hides and skins, raw cotton, raw wool and lac*. The principal commodities imported from the U. K., are *machinery and mill work, cotton manufactures, instruments, dyeing and tanning substances, chemicals etc.* In 1942-43 the imports amounted to Rs. 29,56 lakhs and the value of exports was Rs. 57,94 lakhs.

After World War I, Japan became a formidable competitor of the U. K., in the Indian Market, till 1939. The principal commodities exported to Japan were *raw cotton, jute (raw and manufactured), hides and skins, metals and ores and grains* and the imports from Japan consisted of *cotton piecegoods, iron and steel, machinery, silk, chemicals and toys*. The balance of trade in relation to Japan was not favourable to India

The share of the U. S. A. in the foreign trade of India has almost doubled since the outbreak of the World War II and the increase is being more than maintained even up to the present day. Next to the United Kingdom, the U. S. A., has the largest amount of trade with India at present. Before 1914, the U. S. A., supplied only 3.1 p.c., of India's imports and took 7.5 p.c., of her exports. In 1942-43 the States supplied 20.2 p.c., of Indian imports and took 14.8 p.c., of her exports. India's principal exports to the U. S. A., are *tea, jute (raw and manufactured), hides and skins, lac, oil seeds, raw wool, raw cotton etc.*, and the principal imports from the U. S. A., comprise *machinery, instruments, dyeing and tanning substances, paper and paste-board, medicines etc.* In 1942-43, the imports from the U. S. A., were worth Rs. 19,12 lakhs and the corresponding exports were valued at Rs. 29,79 lakhs.

India's trade with *Burma*, which was treated before April 1937 as coasting trade, is gradually growing in

importance The aggregate value of Indo-Burma trade during 1941-42 amounted to Rs. 42,43 lakhs. India's principal imports from Burma consist chiefly of mineral oil, rice and teak wood. The chief articles exported to Burma are cotton and jute manufactures, coal and coke, iron and steel, wheat and wheat flour, vegetable oils, paper and chemicals. Burma.

India imports raw wool, wheat, zinc, and provision and stores from Australia and supplies tea, jute and cotton manufactures, raw cotton, oil-seeds etc., to Australia. In 1942-43 imports from Australia were valued at Rs. 3,22 lakhs and the corresponding exports were worth Rs. 16,19 lakhs. There is a likelihood of the expansion of trade with Australia. Australia.

Canada imports jute manufactures and tea mainly from India and exports motor cars and parts, locomotives, paper and paste board, copper and wheat to India.

Ceylon, China, Java, Union of S. Africa, Argentine, Brazil, U. S. S. R., Iron, Iraq, Egypt, Turkey, etc are the other countries with which India's trade is increasing. A noteworthy feature in 1942-43, was the expansion of trade with Iran which increased nearly 3 times both in imports and exports. Trade with Egypt increased substantially on the import side but that in exports recorded a fall. Canada.
Other Countries.

Although the foreign trade of India is for the most part sea-borne trade, India has also a large trans-frontier land route trade. India has an extensive land frontier (about 6000 miles) on the north-west and north-east. But trade in this direction has not much developed owing to the presence of inaccessible mountains and dense forests, absence of quicker means of transport and political reasons. There are only a few openings or passes and this makes communication with trans-frontier countries difficult. In recent Land trade.

times, the means of transport, specially in N. W. F. P., has improved. Though the Frontier Railway was established for strategic purposes originally, yet it is serving now as an artery of commerce. The principal trans-frontier countries with which India has trade relations are *Afghanistan, Central Asia, Persia, Nepal, Tibet, the Shan States, Western China, Thailand*, etc. It is needless to point out that these countries present almost a 'virgin field' for exploitation by Indian manufacturers. The chief exports of India across the frontier are *cotton piece-goods, sugar, yarns, metals and manufactured goods*. Imports from the countries consists of *fruits, wool, rugs and hides and skins*.

In the volume of trade, India ranks fifth in the world, but the high population keeps her per capita trade figure at a very low level. India's foreign trade normally shows a favourable balance i.e. it shows an excess of exports (in merchandise) over imports. But when we take into account the invisible imports of India, the balance of trade hardly shows an excess in her favour. She has to pay huge amounts as *interest* on the debt contracted in foreign countries for railways, irrigation and other purposes. She has also to pay what are called "Home charges" to London. The *Home charges* are payments to be made to Britain on account of army and marine service, pensions and leave allowances of retired British officers from Indian service, maintenance of the office of the Secretary of State, etc., etc. India has also to pay a heavy amount as shipping freight to foreign countries. When India becomes a free nation—which she is expected to be in very near future—most of these payments will be stopped. The Indianisation of civil and military services and the abolition of the office of the Secretary of State, will stop much drainage of India's resources. But to stop completely all invisible imports

India must build up efficient banking, insurance, shipping and aviation companies.

THE PRINCIPAL PORTS OF INDIA

The principal ports beginning with Karachi following the coastline right round the Peninsula to Chittagong are—Karachi, Okha, Bhavanagar, Surat, Mormugao, Bombay, Mangalore, Tellicherry, Calicut, Cochin, Tuticorin, Negapatam, Karikal, Madras, Masulipatam, Vizagapatam, Bimlipatam, Calcutta and Chittagong.

The principal exports

Karachi—Wheat, cotton, wool, oil-seeds, hides and skins

Okha

Bhavanagar

Surat

} —Oil-seeds and cotton.

Mormugao—Manganese, groundnuts, cotton, cocoanuts, hides and skins

Bombay—Cotton, groundnuts, grains, hides and skins, iron and manganese ore, myrobalans, cotton piecegoods, twists and yarns.

Mangalore—Coffee, rubber, sandal-wood, rice, salt-fish, dried fruits, tea, pepper, and cashew kernels.

Tellicherry—Coffee, pepper, copra, sandal-wood, tea, ginger, cardamom and rose-wood

Calicut—Cair, cair-fibre, copra, coffee, tea, pepper, ginger, rubber, groundnut, and raw cotton

Cochin—Cair, cair-mats, copra, cocoanut oil, lemon-grass oil, cashew kernels, tea, rubber and groundnut.

Tuticorin—Raw cotton, tea, pulses, rice and cardamoms.

Negapatam—Groundnuts, tobacco, cotton, piecegoods and vegetables

The
exp
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ports of
India

Karikal—Rice and bettlenuts.

Madras—Groundnuts, hides and skins, onions, tobacco, raw cotton, iron ore and iron scrap, oil-cakes and coffee.

Vizagapatam—Manganese ore, myrobalans, oil seeds and cakes.

Bimlipatam—Jute, myrobalans and oil seeds.

Calcutta—Jute and jute manufactures, tea, rice, raw cotton, lac, coal, mica, manganese ore, and hides and skins

Chittagong—Tea, jute, raw cotton, rice, spices and tobacco

DESCRIPTION OF THE PORTS

Calcutta—See page 235.

Bombay—See page 236.

Madras—See page 237.

Karachi—See page 238.

Vizagapatam—Within recent years Vizagapatam has become a first class port. This town is partly sheltered behind the headland called the Dolphin's Nose. The B. N. Railway which serves these areas are offering favourable rates and the harbour has been built at a great cost. The agricultural and mineral products of C. P. and Orissa were formerly shipped off at Calcutta or Bombay. At present, Vizagapatam offers better facilities to these parts than Calcutta, with regard to distance and charges. This port is connected with Raipur in C. P. by the B. N. Railways. Thus Vizagapatam is provided with a vast hinterland comprising of C. P., Orissa and N. Madras, served by a network of railways. This port, by competing with Calcutta, has taken away a large portion of the latter's traffic. Vizagapatam has become a major port of call for all ocean and coastal traffic steamers. The traffic of the port of Madras has also been diverted to some extent to Vizagapatam.

Manganese, groundnuts, myrobalans, hides and skins are the chief exports. The chief imports are *sugar, cotton piece-goods, iron, timber and machinery*. It has a ship-building yard.

Chittagong—It is a leading port of Bengal and is noted for the export of *tea*. It has become a major port, since the completion of the B. and A. Railway. The situation on the Karnafuli about 11 miles from the sea is ideal but the formation of sand-bars creates difficulties in the way of navigation. The other exports are *jute, rice, raw cotton* etc. and the imports are *chemicals, machinery, metals, salt, cotton manufactures*, etc.

Situation
and
character-
istics

Tuticorin—It is the south-eastern terminus of the South Indian Railway, and a leading port of the Madras Presidency. This port which is open all the year round, has next to Madras and Cochin, the largest trade in Southern India. The harbour is shallow and steamers have to anchor about 5 miles from the shore. Continuous dredging operation is necessary to keep the channel open between the shore and the roadstead. There is a very considerable trade with Ceylon in *rice, pulses, onions, chillies* and *live-stock* for consumption in that island. Other articles of export are *raw cotton, tea, cardamom*, etc.

Character-
istics of
the port

Cochin—Only recently Cochin has been raised to the status of a major port due to a marvellous piece of engineering work completed in 1936. It is situated 90 miles South of Calicut and is also the most important port between Bombay and Colombo. The recent developments include the construction of a railway from the mainland over a mile-long bridge to a reclaimed island, where modern wharves have been built. The great problem had been to dig a channel through a wide bar of sand out at sea which effectively blocked the entrance to the port from the sea. This problem being solved Cochin has now become a major

Situation
and
character-
istics

port serving a vast hinterland comprising the states of Cochin and Travancore and the southern parts of the Madras Presidency.

Mormugao—It is situated on the eastern extremity of the Mormugao peninsula in Portuguese India. The port is open all the year round. It is 'a distributing port and her foreign exports consist of the produce of the Bombay-Deccan, Hyderabad and Mysore,—particularly *manganese, groundnuts, cotton, coconuts etc.*

INDUSTRIAL AND COMMERCIAL CENTRES

Allahabad at the confluence of the Ganges and Jumna in the U. P., is a commercial town. Formerly, it was the capital of U. P. There are several oil mills, glass factories and flour mills here

Ahmedabad—is the second largest city in the Bombay Presidency. It is an important railway junction on the B. B. & C. I. Ry. It is 300 miles from Bombay. The principal industry of the city is spinning and weaving of cotton yarn. Indeed, next to Bombay, it is the greatest cotton manufacturing centre in India. There are more than 75 cotton mills. The climatic conditions are more favourable in Ahmedabad for cotton manufacturing than in Bombay.

Amritsar—It is the most flourishing city in the Punjab and is famous for its carpets and shawls. The city is a centre of the Sikh religion and contains the golden temple. It stands on the main line of the N. W. Railway and is 1,143 miles from Calcutta. Cotton mills are engaged in the manufacture of various kinds of textiles.

Asansol—in W. Bengal, is a noted centre of coal industry. Near about it is the seat of iron and steel industry of Messrs. Burn & Co. It is also an important railway junction of the E. I. Ry.

Agra—a historical town on the Jumna, is an important trade and railway centre. The articles of trade are carpets, brass-wares, marbles, ivory etc., etc.

Aligarh—in the U. P., is famous for its manufacture of locks and other brass wares. Bangles and other glass wares and carpets are also manufactured. The dairy industry is rapidly developing and butter is exported in large quantities.

Bangalore—in the Mysore State, is the largest city, noted for the manufacture of carpet, cotton textiles, woollen goods and leather. Sandal oil is used in soap-making and medicine. Climate is healthy. It is 219 miles by rail from Madras. Recently, an air-craft industry under the auspices of the Govt. of India has been established here.

Benares—situated on the Ganges, is the holy city of the Hindus and an important commercial centre of the United Provinces. It is noted for brass work, silk manufacture and jewellery industry.

Barisal—in E. Bengal, is an important river port. It is noted for the export of *rice* and *jute*.

Belgaum—in the Bombay Presidency, is an important silk and cotton centre.

Cawnpore—is a great collecting and distributing centre for North India. It is also an important railway junction and has the largest manufacturing industries of all U. P. Cotton pressing and ginning are chief industries. The other factories include sugar mills, leather works, flour mills, iron foundries, chemical works, cotton mills and oil mills. From Calcutta coal, raw cotton, wheat, kerosene, salt, sugar, tea, tobacco and linseed arrive here to be distributed to the interior. The distance of Cawnpore from Calcutta is 634 miles.

Cuttack—is the capital of Orissa. It has manufactures of lac-bangles, shoes, toys and combs. It is served by the B. N. Railway.

Chandpur—an important river port of Eastern Bengal is noted for export of jute and rice.

Delhi, the capital of India, is situated at the junction of nine railway lines. It is an important *clearing route* for the Punjab and the Western districts of U. P., in cotton, silk and woollen piece-goods. The city boasts of several cotton-spinning and weaving mills and flour mills. Ivory carving, jewellery works, lace works, pottery and gold embroidery are the artistic works. It is nearly 900 miles from Calcutta.

Dacca is the most important city of Eastern Bengal. Weaving of muslin and embroidery are famous from early times. Dacca is the principal centre for making bangles and buttons. It lies in the centre of jute-producing districts and is the most important inland centre for the collection and export of jute.

Dehra-Dun—in the U. P., is a noted town. Its climate is very healthy. It has a forest research institute.

Darjeeling—is the summer capital of Bengal and ranks next to Simla as the most important hill-station in northern India. It is famous for *tea and oranges*.

Digboi—situated on the eastern extremity of the Brahmaputra Valley in Assam, is the most important *petroleum* mining centre in India.

Jamshedpur—in Bihar is the seat of Sir Jamshedji Tata's iron and steel factory, which is the largest in Asia, except the government workshop of Japan. The situation is ideal. The deposits of iron-ore are only 50 miles away and coal has to be brought only from a distance of about 100 miles. The requirements of limestone can be satisfied from the neighbouring regions. The Subarnarekha, although it is not navigable, supplies the water requirements of the industry. It is served by the B. N. Railway. The rapid

expansion of the town is also due to the growth of a large number of industries connected with the steel industry.

Jubbulpore—On the Narmada in C. P., is an important railway centre. Near about it is the Narmada falls. It has cotton mills, cement and glass factories and it is noted for its potteries also. Extensive manganese deposits occur in the neighbourhood.

Jodhpur—in Rajputana is noted for dyeing and printing cotton goods. Brass and iron utensils are also made here.

Jharia—in Bihar, is a coal-field town and an important commercial centre.

Kalimpong—It is a hill station near Darjeeling in Bengal. Nearest railway station is Siliguri, 4,000 ft high. Wool is imported from Tibet through this town.

Katni—in the C. P., is an important centre for utensils, grains and stones.

Lahore—the capital of the Punjab, is the chief trading centre for the agricultural produce of the province. Leather-trade is important. Cotton weaving, tanneries, glass-works, flour mills, sugar mills and tobacco works are the chief industries. It is the largest city in the province and contains a population of more than 400,000.

Lucknow—The town is situated on the bank of the Ganges and is the junction of the several branches of the O and R railway. Lucknow is the largest city of the U. P., and the fourth largest in India. Lucknow was once noted for the production of rich fabrics and costly jewellery. Cotton fabrics of all grades are still manufactured. The place is also celebrated for embroidery with gold and silver thread. Cotton printing is still a flourishing industry. There are a number of factories and railway workshops and iron foundries. Lucknow is an important centre of education.

and literary activity in the U. P. The traffic is carried by the E. I. Railway.

Ludhiana—in the Punjab, is a railway centre; it has modern cotton mills and is the centre of hosiery-making industry.

Lyallpur—in the Punjab is a big wheat exporting centre; it is also a flourishing industrial town.

Lashkar—the capital of the Gwallior State contains a number of factories and is the centre of an important stone quarrying and carving industry. Tobacco cultivation is developing and it also manufactures cigarettes.

Moradabad—is a railway centre in the U. P., is noted for its plain and ornamental brass wares.

Murshidabad—on the Bhagirathce in Bengal, was the capital of Bengal during the Moghal period. It is an important centre of sericulture and is also famous for brass wares.

Mirzapur—in the United Provinces is noted for lac industry and manufacture of domestic utensils made of brass. There is also a carpet industry.

Madura—is the centre of silk and cotton weaving and dyeing industries and is one of the leading industrial centres of the Madras Presidency.

Multan—is the natural collecting centre for the S. W. Punjab. It is a very old town with old local industries.

Naraingunge—is an important river port and trade centre of Eastern Bengal. It is an important jute collecting and exporting centre. There are a few cotton mills also.

Nagpur—is the leading industrial and commercial town of the Central Provinces. It is situated at the junction of the G. I. P. Railway and B. N. Railway. Its cotton trade is very important. There are extensive manganese deposits in the neighbourhood. It is also famous for oranges. It

has spinning and weaving mills, cotton ginning and pressing factories and other industries.

Patna—the capital of Bihar, is a railway junction, a commercial town and a collecting centre of agricultural products.

Puri—pleasantly situated on the sea-coast is a holy city of the Hindus in Orissa. It is noted for the manufacturing of brass-wares, silver and gold ornaments and shoes.

Peshawar—is the chief town and seat of government of the North-West Frontier Province. It controls the route to Khyber Pass and thus nearly all the trade between India and Afghanistan.

Quilon—in Travancore, has been a trading centre from very early times and is now an important port for the export of coconut, oil, coir mats, timber and fish. It has some cotton mills.

Rawalpindi—an important trade centre of the Punjab, is the starting point for the principal routes into Kashmir. For this reason, it is the centre for Indian-Kashmir trade.

Sialkot—is the centre of the sports goods industry in the Punjab.

Srinagar—the capital of Kashmir, is situated on the Jhelum. It is famous for its embroideries and carved wood work. It has silk and woollen industries.

Sylhet—is the chief town of the fertile Surma Valley of Assam. It is famous for oranges and lime.

Silchar—situated in Surma Valley of Assam, is a centre of tea trade.

Surat—is a town in Southern Gujerat, near the mouth of the Tapti river. Once an important port, it is now famous for gold and silver thread making industry. Cotton manufacture is also important.

Sambalpur—is an important silk and cotton weaving centre in Orissa.

Serajunge—in Bengal, is situated on the Jamuna. It is a great centre of jute trade.

Simla—a hill station in the Punjab, is the summer capital of the Government of India. It has trade with Tibet.

Trichinopoly—in the Madras Presidency is noted for tobacco manufactures

Titagarh—in Bengal, near about Calcutta, is an industrial centre and the seat of paper-making industry.

Wardha—in the C. P., is an important town for the collection of raw cotton.

STUDIES AND QUESTIONS

1. Divide India into natural regions. Describe the climate, products and industries in each of them. (Cal Inter. 1929, 1938).
2. Account for the variety in the distribution of rainfall in India and show the effect on the chief products. (Cal. Inter. 1941).
3. What do you understand by the monsoon type of climate? Can you say why so much importance is attached to the monsoons in India? (Cal. Inter. 1942).
4. On a sketch map of India show the regions of important timber resources. How are those utilized at present? Discuss the prospects of increasing exports of Indian timber to the world's markets. (Dacca Inter. 1940, Cal B.Com 1941).
5. Give an account of the forest products of India and state where they are found. (Cal. Inter 1927, 1946)
6. Describe the various methods of irrigation in India. Indicate the regions where each is practised. (Cal. Inter. 1934, 1937, 1940, U P. Inter. 1934).

7. Examine and estimate the importance of the following agricultural products—(a) Wheat, (b) Rice, (c) Maize, (d) Cotton and (e) Jute. (Cal Inter. 1932, 1935).
8. Name five important oilseeds of India, describing the areas where they are grown and the uses to which they are put. (Cal. Inter 1933, 1946).
9. On a sketch map of India show the important regions of wool production, together with the centres for imported wool. Where is the Indian wool mainly consumed? (Cal. B.Com. 1941)
10. Examine the iron resources of India. Show how far these are located near the coal-bearing areas of India. (Cal Inter. 1936).
11. Examine the important minerals to be found in India and the places where they can be found. (Cal Inter. 1934, 1939)
12. State the places in India where the following are found—Manganese, Copper, Mica and Salt. Also mention their commercial uses. (Cal. Inter. 1944).
13. What are India's available sources of power? To what extent is she using them, and for what purposes? (Cal. Inter. 1941; U P. 1936).
14. Give an account of the water power resources of India. (Cal. Inter. 1935, 1937)
15. Examine the present position of the coal industry in India. Indicate the methods by which the condition of the industry may be improved. (Cal. Inter 1935).
16. Examine the present position and future prospects of the sugar industry in India. (Cal. Inter 1936, 1939).

35. The Punjab is said to possess the most well-developed canal system in the world. Why? Give a description of the system and mention its economic advantages. (U. P. Inter. 1942).
36. Draw a map of India, showing the distribution of forests and describe their effect on Indian industries and agriculture. (U P. Inter. 1932).
37. Describe the development of hydro-electric power in Northern India. Mention its importance to agriculture, and describe the industries of the areas served by each scheme. (U. P. Inter. 1940).
38. What factors determine the location of an industry? Account for the distribution of cotton, jute and sugar manufacturing industries in India. (U. P. Inter. 1934).
39. Mention the most important cottage industries of India. Suggest ways for their improvement. (U. P. Inter. 1938)
40. What are the important features of the foreign trade of India? Give the main items of export trade together with their destinations and discuss their geographical basis. (U. P. Inter 1941).
41. Discuss the geographical factors responsible for the distribution of population in India? Account, in particular, for the high density of population in Bengal and on the Malabar coast (U. P. Inter. 1936; Cal. Inter. 1934, 1940, 1942; Dacca Inter. 1941).
42. Write a short essay on the foreign trade of India stating (a) imports and their sources, (b) exports and their destinations. (Cal. Inter 1933, B.Com. 1937 and Dacca Inter. 1941)

43. Draw a map of India and show on it the distribution of coal, iron, manganese, mica and copper and the centres of iron and steel industry. (U. P. Inter. 1942).
44. Explain fully the geographical conditions necessary for the growth of cotton and wheat. Show on a sketch map the principal regions of their production in India. (U. P. Inter. 1939)
45. Give the geographical conditions necessary for the production of rice and show its distribution on a sketch map of India. How is it that in spite of her large home production India imports rice? (U. P. Inter. 1941)
46. "India is the leading mica-exporting country of the world and is likely to remain so"—examine this statement. (Cal. Inter. 1945).
47. Name the three important industries of Bengal. State briefly the circumstances which favoured their development. (Cal. Inter. 1945).
48. Do you think that India possesses all the advantages for the development of the Automobile industry? (Cal. Inter. 1945).